Derech HaTeva דרך הטבע

A JOURNAL OF TORAH AND SCIENCE

VOLUME 11 2006 – 2007 תשס"ז

A PUBLICATION OF STERN COLLEGE FOR WOMEN YESHIVA UNIVERSITY

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LAYOUT	Amir Achitoov
PRINTING	Tova Press, Inc.

DEDICATION

We dedicate this issue to Elizabeth Isaacs Gilbert z"l who served as the first Dean of Students at Stern College for Women from the day of its inauguration in 1955 until 1967. Dean Gilbert, the daughter of Rabbi Philip Klein and the great-granddaughter of Rabbi Samson Raphael Hirsch, was a prominent member of the administration who set high standards for student conduct and served as a role model for hundreds of women. May her memory always serve as a blessing.

ACKNOWLEDGEMENTS

We would like to thank the Office of the Dean and the Office of Admissions at Stern College for Women.

We give our sincerest gratitude to Dr. Harvey Babich for his enthusiasm, guidance, and support. Serving as a guiding light in the production of this journal, Dr. Harvey Babich has provided unconditional assistance, and his dedication and commitment extend far beyond the pages of this journal.

SINCERELY,

THE EDITORS:

Abigail Atlas Jessica Feig Adeena Goldstein

PASUK

אמר ר' מאיר: על כל נשימה ונשימה שהאדם מעלה חייב לקלס את יוצרו.

מנין?

שנאמר (תהילים ק"נ): כל נשמה תהלל יה'.

(דברים רבה ב:ל"ו)

For each and every breath that person breathes, he is required to praise his Creator.

From where do we learn this?

As it says: (Psalms 150:6) "Every soul will praise You..."

(Devarim Rabbah 2:36)

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BIBLICAL PLAGUES IN MODERN TIMES

JUDY ALKOBY

With the assistance of media and technology, anthrax has become a ubiquitous household fear. The anthrax scare made the world conscious of epidemics and its greater detrimental effects on society. However, *Bacillus anthracis*, the causative agent of anthrax, and airborne pathogenic microbes are not as familiar in present times. Allusions to anthrax and other epidemics causing dermatopathologies are referenced to ancient Egyptian civilization. One example is the skin disease of *shechin*. Mentioned in various places in Tanach, *shechin*, a skin disease reaching epidemic proportions, has stirred the curiosity of many biblical commentators and physicians. Commonly and loosely translated as boils, it is most famous for its service as the agent of the sixth plague in Egypt. It is also recorded that *shechin* affected King Chezkiah and Iyov (*Malachim Bet* 19:8, *Iyov* 2:6-8). After closer examination of the symptoms of *shechin*, its definition as "boils" seems too vague and may possibly be a misnomer.

Scientists and physicians differ in their conclusion of the identity of the dermatological disease termed *shechin*. Many argue as to whether *shechin* is a skin condition or rather, a metaphysical infliction. It is hard to arrive at a concrete decision based on the limited knowledge from the texts. Nonetheless, some detailed descriptions of *shechin* seem unique to specific skin epidemics, implying *shechin's* dermatological pathology. In reference to the ten plagues, the text states (*Shemot* 9:9):

> "And it [the handfuls of soot from the furnace that Moshe and Aharon threw towards the sky] shall become small dust in all the land of Egypt, and it shall be boils breaking out in blisters upon man, upon beast throughout all the land of Egypt."

Rabbi Shlomo ben Yitchack (Rashi) explains that the word *shechin* (boils) means "hot" (*Shemot* 9:9), understood by many scholars as a description of an inflamed skin lesion. The Talmud adds (*Nega'im* Chap. 9, Mishnah 1) that the lesions were wet on the surface and dry on the inside. This added commentary might suggest that the lesions were "ruptured vesicles or pustules". [1] Dr. L. Hoenig combines these two biblical commentaries and concludes that *shechin* can be attributed to viral diseases of either smallpox or cowpox. [1] The white appearance of the lesions serves as evidence of *shechin's* origin as smallpox or cowpox, affecting both humans and animals alike. [1]

Physician Dr. J.S. Marr and public health analyst C.D. Malloy argue that *shechin* is an actual dermatological condition. They compiled a list of various proposals of the disease and noted evidence to support each proposal, as suggested by various sources. Marr and Malloy took notice that the *shechin* affected both human and animals, indicative of the epidemic's epizootic nature. [2] The first suggestion, from G. Hort (Netherlands, 1957) and H.W. Blanc (U.S., 1890), credits *shechin* as an ulcero-glandular anthrax, transmitted by various flies. [2] Another, presented by H. M. D. Hoyte (Australia 1993), states that *shechin* was a combined staphylococcal-streptococcal bacterial infection, specified as 'ecthyma'. Ecthyma can also be transmitted by flies to both humans and animals. [2] While both anthrax and this staphylococcal-streptococcal infection cause severe skin infections and can be transmitted by flies, physical contact, or contaminated food, anthrax spores, unlike the bacteria responsible for the staphylococcal-streptococcal infection, can be airborne and associated with more widespread damaging effects. [2] It is more likely, then, that such a devastating plague was caused by anthrax or some other airborne microbes.

After closer examination of the symptoms of *shechin*, its definition as "boils" seems too vague and may possibly be a misnomer.

Marr and Malloy suggested yet another alternative bacterial candidate for *shechin*. They propose *shechin* is glanders disease (causative agent, *Pseudomonas mallei*), a highly contagious airborne bacterial disease transmitted by direct contact or by fly bites. [2] Glanders, currently found within the Middle East and Africa, is primarily a respiratory infection that afflicts horses, donkeys, mules, and goats, but can affect humans, as well. [2] Marr and Malloy described the symptoms in humans: "Human disease consists of nodular eruptions on the face, legs, arms, involvement of the nasal mucosa and later pyemia, and metastatic pneumonia". [2] This class of glanders may be another possible description of the biblical *shechin*.

Dr. L. Ben-Noun, of the Ben-Gurion University provides the most conclusive evidence, remarking that the symptoms of *shechin* match the clinical symptoms of anthrax. [3] On the contrary, Dr. A.R. Freilich, a physician, claims that *shechin* is characterized in the Torah as lesions on previously abnormal skin, which often develops white hairs or an increase in size in the lesion. In other words, *shechin* is hypopigmented skin patches arising on already irregular skin. Abnormal skin can involve erythma, vesicle formation, crust, weeping, or erosions. It also includes any skin that has undergone a burn, traumatic injury, or eczematous dermatitis. Dr. Freilich claims that although it would appear that *shechin* is postinflammatory hypopigmentation, it is unusual for postinflammatory hypopigmentation to develop secondary changes including white hairs and an increase in size. Therefore, he concluded that *shechin* may no longer exist. [4]

Regardless of what is the exact definition of *shechin*, most evidence seems to indicate that *shechin* was caused by an airborne microbial pathogen. The time gap of the Bible with present commentary may be what is leading commentators astray to no one final concrete answer. ■

ACKNOWLEDGEMENTS

I would like to thank Dr. Babich for his constant guidance with this article. Thank you for taking the time to help me find sources and edit this essay. I would also like to thank the tutors in the Stern College for Women *bet midrash* for helping me find the Judaic sources.

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PASSIVE EUTHANASIA - A POSSIBLE EXCEPTION TO PIKUACH NEFESH?

CLAUDIA ESTHER AMZALLAG

During the course of the last century, the use of Eu thanasia as a "mercy killing" has created much con troversy both ethically and religiously. The term "eu thanasia," introduced in 1869 by William Edward Hartpole Lecky, was derived from the Greek language meaning "good death." Then, the term was used specifically to refer to the process of injecting a lethal dose to terminate an ill patient's life. Modern use of the term euthanasia has much broader applications. It is now used to refer to two subcategories called active and passive euthanasia. The difference lies in that active euthanasia is the active process of ending a patient's life early using a drug whereas in passive euthanasia, further treatment is withheld from the patient, such as resuscitation or chemotherapy. Within the passive euthanasia category, there is a dichotomy between the mitzvah of pikuach nefesh, saving a life, and the mitzvah of alleviating pain and suffering from a person. How far does the mitzvah of pikuach nefesh extend? Are there any exceptions?

Most rabbinical authorities strictly prohibit the practice of active euthanasia based on many sources. The first and foremost is that of the Ten Commandments "You Shall not murder" (Exodus 20:13; Deuteronomy 5:17). The importance that Judaism places on life is enormous. The mitzvah of saving another's life, pikuach nefesh, is prioritized beyond any other commandments, including the prohibitions of eating Yom Kippur and of labor on Shabbat. One is obligated to transgress these commandments if there is even the slightest doubt that a person might be in danger. [1]

The second issue at hand is the question of whether it is appropriate for human beings to "play G-d" by choosing when to end a person's life. As most rabbinical authorities point out, we should not forget that Hashem is above it all and has a plan for each of us. 'Life is a precious gift of G-d and God alone determines when the time has come for a person to die (Job: 1:21). One might argue that times have changed and that we should take advantage of medical advances such as euthanasia. However, many Rabbis insist that we should in fact take advantage of this progress only as long it does interfere with God's plan. We should not forget that our bodies are not our own but temporary receptacles for our souls. Thirdly, many rabbinical sources point out that by allowing the use of euthanasia, we are giving science too much power. "Heal, he shall heal" (Exodus 21:19) gives the responsibility to a physician to care for a life. However, the responsibility does not extend beyond the point where the physical healing is no longer possible.

Finally, and closely related to the previous idea, is that by using euthanasia, one is actively renouncing hope. Judaism strongly believes in the impact of our prayers and having faith in God. Throughout our history, we have always prayed, putting in our personal effort and relying on Hashem to do the rest. There are some cases such as that of a handicapped person or an ill, elderly person where life is excruciatingly painful in many ways. Despite this, the quality or duration of a life is irrelevant in Judaism. By even questioning the value of a life, one degrades the inherent holiness of a Jewish life. The life of a handicapped or elderly person is not unproductive because her or she is impaired. Judaism believes that the body is only a receptacle for the soul, the true essence a person, which comes to earth for a particular purpose. "We have to factor in the possibility of having them present on earth to elicit certain responses on our part" [2], such as gratitude.

Within the passive euthanasia category, there is a dichotomy between the mitzvah of pikuach nefesh, saving a life, and the mitzvah of alleviating pain and suffering from a person.

Why would passive euthanasia be allowed sometimes as opposed to active euthanasia which is always prohibited? Active euthanasia is deliberately ending a person's life by unplugging or injecting a lethal dose. However, in passive euthanasia, one does not take steps to actively end a person's life but rather chooses to withhold future treatment. It seems that passive euthanasia is more of a neutral intervention.

The first source supporting passive euthanasia is that of "You shall love your fellow as yourself" (Leviticus 19:18). This commandment is interpreted by the Talmud in the context of minimizing the suffering of a capital criminal preceding his or her execution. The Talmud

is thereby acknowledging that even a capital criminal is entitled the right of dying in dignity. [1]Another source supporting this argument is when the Talmud rules that "You shall choose for him a good death"' as an example of charity. [1] This source might be paralleled to the idea of euthanasia.

Although very few rabbinical authorities give the permission for a patient to decline treatment, Rav Moshe Feinstein, rigorously forbidding active euthanasia, has sanctioned the right, provided that a few requirements are met, to allow passive euthanasia. (Responsa, pp.31-2). Firstly, the patient has to be in terminal condition, having no more than one year to live regardless of the treatment. Secondly, the pain must be such that life while ill is unbearable. Thirdly, the patient must have made a personal request not to be treated. In the cases where the patient cannot communicate his or her desire, the use of "wills"' or of a "next-to-kin" may be permitted solely if done in accordance with Jewish law and while working closely with a Rabbi.

Finally, given that those three conditions are met, the patient can decline certain types of treatments but not those considered essential such as oxygen, food and water. The removal of these three things which are essential for life is considered active euthanasia. The removal of antibiotics might also fall within this category since administering them does not cause any particular pain for the patient. As for a feeding tube, most authorities categorize it in this category as well but specify that a patient should not be force-fed.

Why did the issue of euthanasia never affect our ancestors? In the commentary Pirkei Derebbi Eliezar (Chapter 52), we learn that in the times of our forefathers, there was no illness before death. When it came time for one to die, he would sneeze and the soul would exit through the nostrils. Illness was created when Yaakov Avinu asked Hashem for a "warning" so that he could bless and instruct his children. (Genesis 49:33).For some, having the ability to prepare for death is a blessing, but for others, it is far too difficult. The problem with illness in those days was that no one ever recovered from it until the time of King Hezekiah. When the latter was informed by prophet Isaiah that he would die, he prayed to Hashem who then added fifteen years to his life. (Kings 2 20:1-6) . Hezekiah reasoned that if one had prayed and hoped for recovery, he "fully repents" (Midrash Rabbah Genesis 65:9, Pirkei D'Rebbi Eliezer 52). Adding hope was essential to Yaakov's installment of death by Hashem. Hope and Tefillah are key elements to a Jewish existence.

As the wise King Solomon says "To everything, there is a season and time to every purpose under heaven, a time to be born and a time to die "(3:1-2). The reality is that times of illnesses and deaths are extremely difficult for everyone. Moreover, having to deal with biomedical and religious issues simultaneously can be strenuous. Most rabbinical sources advise that in these complicated cases, working with doctors and closely with a rabbi are necessary and can help alleviate the burden. ■

ACKNOWLEDGEMENTS

I would like to thank Hashem for good health as well as my parents for constantly encouraging me to open my horizons and look for clarity both in secular and religious sources. I would also like to greatly thank Dr. Babich for his great support, kindness, patience and for giving us a beautiful opportunity.

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TORAH PERSPECTIVES ON NON-ALTRUISTIC ORGAN DONATION

ABIGAIL ATLAS

Jewish law prioritizes the preservation of human life before almost every other consideration[1]. The Talmud tells that "He who saves a single life is as if he saves an entire world [1]." Modern medical advances have allowed for the saving of lives using methods that were impossible in previous generations. Today, a live person donating a kidney to save the life of a friend, family member, or stranger has become a common practice. Due to the fact that today's medical authorities do not consider live kidney donation a major health risk for the donor, Rabbi Ovadiah Yosef [3], Rabbi Jacob Josef Weiss, Rabbi Moshe Meiselman [4], and other leading deciders of Jewish law maintain the permissibility of this practice. Rabbi Eliezer Waldenberg concludes that if a group of highly qualified physicians testifies that there is no risk to the patient, then the donation of a kidney is sanctioned by halakha [4]. What, however, does Jewish law say about non-altruistic organ donation? The ethical and legal implications of a person receiving money for the donation of a kidney are extremely significant. The following article will address the halakhic issues concerning live kidney donation, focusing specifically on the non-altruistic sort.

The first question to address is whether a person is permitted by halakha to inflict injury upon himself. According to one Talmudic source, a person may do so if this injury has a beneficial purpose [5]. In another Talmudic source however, the criteria for what is considered beneficial enough to allow one to cause his body harm are further delineated [6]. According to this second source, the gain derived from this injury must be a "great" benefit; injuring oneself for a more "minor" benefit is prohibited. Rabbi Joseph Karo, the codifier of the important halakhic work, the *Shulhan Arukh*, maintains the opinion of this second source. According to this view, it seems that it is not acceptable to cause oneself harm for the sole purpose of financial gain, a "minor" benefit. However, causing oneself bodily injury to save someone else's life or to greatly improve another's quality of life is deemed a "great benefit," legitimizing self-injury.

In the 16th century, Rabbi David ibn Zimra addressed the following question: a ruler threatens to kill one person if another does not amputate a limb or organ that is not vitally essential. Would this amputation be halakhically permissible? According to the law as codified in the *Shulhan Arukh*, it would be permissible for one to amputate a limb to save the life of another. A contemporary of Rabbi Karo, Rabbi Ibn Zimra agrees that such an amputation is permissible; Rabbi ibn Zimra, however, says that not only would this would be allowed, but goes even further to say that it would be "praiseworthy." Although halakha could not possibly demand that one donate his or her organ or limb to save the life of another person, he says, such amputation is a "most pious act," as long as the life of the donor is not endangered by this procedure. This view dominates in halakhic literature and it is on this basis that modern halakhic authorities uphold the permissibility of live kidney donation [3].

Rabbi Shelomo Goren, the late Chief Rabbi of Israel, writes that it is praiseworthy to donate a kidney even if one will receive financial compensation [3]. Receiving compensation for an act that is usually thought to be altruistic may at first seem disturbing and non-ethical. Additionally, it seems that such donations would be questionable in the legal sense as well. Issues that could potentially stand in the way of permitting non-altruistic donations are: whether a person is allowed to receive payment for the fulfillment of divine commandments, the effect that this practice could have on society as a whole, and the mutual consent needed by both parties for a sale to be considered valid by Jewish law.

> If people view organ donation as a means of moneymaking, there is a danger that an organ market will result, in which people in need of money sell their organs to pay off debt.

According to the Gemara [7], one cannot demand payment for teaching Torah. In modern times, a teacher can accept money for Torah instruction for reasons that are beyond the scope of this article. However, the principle that one cannot insist on monetary compensation for the teaching of Torah extends to the following of all of the commandments; just as in principle one should not receive money to teach the Divine law, he also should not accept money for

1 The preservation of life is prioritized before all but three commandments: idol worship, illicit sexual relationships, and murder [2]

following the law itself. "Since healing is a commandment of the Torah, the healer may not demand payment for healing. It would apparently follow that one may not be reimbursed for donating an organ for lifesaving purposes [8]. "

Though a healer cannot accept compensation for the healing itself, he or she can take money for the time, expenses, and medications or equipment given to the patient [7]. It follows that an organ donor can receive money, not for facilitating the healing of the patient, but rather for the inconveniences that come along with such donation. The obvious downside to organ donation is the suffering that one experiences during the removal of the organ [7]. Additionally, there is an essential difference between a medical doctor and a kidney donor. While a physician is charged with the obligation to use his knowledge of medicine to attempt to heal others because of the commandment "and heal you should heal," an organ donor is not by any means obligated to donate an organ. The law with regard to compensation would thus differ [7, 9]. "It may be argued that one who has no right to refuse rendering medical service ought have no claim to compensation...a donor...who is under no obligation to donate an organ...has the right to claim compensation [7]." Thus, the issue of receiving payment for assisting in healing, a divine commandment, has been resolved.

The next halakhic issue to address is the effect that non-altruistic organ donation can pose on society as a whole. If people view organ donation as a means of moneymaking, there is a danger that an organ market will result, in which people in need of money sell their organs to pay off debt. Aside from the fact that it is a terrible reflection on a society if the poor people reach such a state of despair that they resort to the sale of a kidney, such exploitation of the poor must be avoided [7]. Another concern is that prioritization of organs may go to the highest bidder, instead of the most medically needy person, thus making organs available only to the wealthy. Rabbi Yisrael Meir Lau, former Chief Rabbi of Israel, addresses this issue by saying that "poor people are at a disadvantage in competing for limited resources but that is true for a range of medical issues" Exploitation of the poor, he says, should be prevented through legislation of preventative laws [3].

The final legal consideration to evaluate with regard to non-altruistic organ donation is the sale itself. According to Jewish law, in order for the sale to be legal, the doctor must speak with the donor concerning all of the medical issues involved in the donation. If the donor is not appropriately informed, his consent is not valid, nullifying the sale. Additionally, if a poor person, desperate for money, sells an organ because of urgent financial need, he is considered to have been coerced into the sale. One who is coerced is not considered to have consented properly to a sale, unless he is getting the full value of the item sold. "Since financial payment cannot reflect the absolute value of an organ, the donor must be losing something on the transaction thereby invalidating the sale" [7]. Therefore, for a non-altruistic organ donation, the donor must both be aware of the ramifications of the donation and must also not be selling the organ out of urgent need of funds.

In conclusion, the three main halakhic issues with regard to non-altruistic organ donation are resolvable. The idea that the donor is being paid for the inconvenience of the procedure and not for the good deed he is doing helps address the question concerning whether it is ethical to be paid for saving a life. Finally, although halakha generally adopts the approach that it is best to perform a mitzvah with no ulterior motivations, a mitzvah still has religious and ethical significance when one has other motives in mind. [9] ■

ACKNOWLEDGEMENTS

Though I cannot properly express my gratitude to my wonderful parents, I want to thank them for their endless support and guidance. Thanks also to Dr. Babich for his encouragement and sage advice. Finally, thanks to Rabbi Flug for reviewing the Halakhic content of this article.

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NEUROTRANSMITTERS, MEMORY CELLS, AND SPIRITUAL PERCEPTION: WAKE UP AND SMELL THE ROSES

DALIA BARENBOIM

In the span of history, the twenty-first century could hardly be called an ordinary time. We delight daily in a veritable explosion of scientific knowledge, scarcely noticing the swift decline in the global appreciation of spiritual teachings. Thousands of years ago, in a time when the world possessed only scraps of scientific knowledge, our forefather *Avraham Avinu* was able to read the physical world as a map of its metaphysical counterpart. He was so in touch with spiritual wisdom, explains *Maharal* in chapter 20 of *Tiferet Yisrael*, that on his own he could intuit the Torah. Living today without that ability, it is marvelous that we have been gifted with a boost on the side of science. Rather than eschew the spiritual realm in the face of a torrent of scientific discoveries, we can surely harness these momentous new biological, physical, and chemical insights into shedding some light on what our forefather was able to see so plainly. When we peer into our microscopes and perform our experiments, perhaps we can look beyond the mechanics of the studied principle and try to discern a message to enrich our lives.

As an example of the utilization of science, let us delve into the basic principle of physiology that adaptation follows exposure. Without sensory adaptation, we would be aware of each of the myriad sensory stimuli we are bombarded with at any given moment. Sensory receptors are the neurons which stand ready and waiting to receive and transmit impulses. If a stimulus is above a certain intensity, or the perceptual threshold, it will be perceived and transmitted all the way to the brain and translated into consciousness. In inhibitory modulation, the continuous stimulation of a particular sensory receptor often causes this process to slow down or even halt completely. After a suprathreshold stimulus (a stimulus which exceeds the perceptual threshold) is received by the receptor, neurons higher in the pathway to the brain, often secondary or tertiary neurons, dampen the signal. They do this by altering the signal so that it falls below the perceptual threshold. The result is that the signal does not materialize in consciousness; desensitization to that particular stimulus has occurred. The impulse must then change for it to be noticed [1, 2].

We are all familiar with this phenomenon: walk into a locker room smelling powerfully of gym socks and body odor. For a few minutes you will be hard-pressed to remove your hands from shielding your nose, but it won't take long before you barely notice the smell at all. Congratulations, you have experienced adaptation of your olfactory receptors. It will take a new batch of sweaty athletes entering the locker room for your sense of smell to again be disturbed.

In the same way, if you are sitting in class and the teacher is lecturing in such a monotonous fashion so as to produce a sensory desensitization to his auditory stimuli, it may take a new sort of stimulus - his calling on you to answer a question - to alert you. In that case, effort on your part is required to recall the sound information of what he just said from the unconscious to the conscious mind [2].

Judaism could be called the practice of retrieving information from the unconscious and reinstating it to its proper place in the conscious mind. We seek to undo the sensory adaptation and create ourselves as people basking in spiritual awareness.

> Much like the body, our spiritual lives operate according to an elegant logic.

We are so accustomed to the nature of the world that it has taken up residence in our unconscious. In his book *Gesher HaChaim*, Rabbi Yechiel Michel Tucazinsky writes that if there were no developmental periods between birth and full adult awareness, we would all walk around in absolute wonder at the world's beauty and splendor, experiencing full clarity that G-d must have created it. In reality, of course, we do not usually live this way. "Man...generally becomes adapted to his environment and so fails to notice the sublime wonders that surround him on all sides...How could he have closed his eyes to this vast tumultuous sea of miracles..." [3]. In other words, it is rather unfortunate for sensory adaptation to occur in a rose garden. It is those intervening years between birth and maturity that allow for a slow habituation and therefore a dulling of the feelings of awe. The otherwise inevitable shock of exposure is subsumed by the years of infancy and childhood.

In our daily lives, we all experience a regular pattern of perception and fading of spirituality. The clarity of a "spiritual high" is by definition fated to fade. Seminary and yeshiva do not last forever, *shacharit* is followed by time at the office. Writes Rabbi Akiva Tatz in *Living Inspired*: "We are incapable of maintaining the freshness of any experience naturally...The natural pathway is that things which are fresh become stale." In other words, periods of darkness follow periods of

light. Periods of adaptation follow periods of perception. "The challenge of the second phase is to remember the first, to remain inspired by the memory and to use it as fuel for constant growth." Rabbi Tatz quotes *Rambam* in comparing this process to trying to find one's way through a totally dark field. For a moment there is a flash of lightning which illuminates the path, but then all is darkness again and the challenge is to remember what one saw in that instant [4].

When we, the Jewish people, stood at Mount Sinai to receive the Torah directly from G-d, we had our flash of lightning. It was a moment of national clarity that we must remember in all the subsequent generations of darkness. For a short time, we lived in a world in which "reality was based in Spirit," writes Rabbi Jeremy Kagan in *The Jewish Self*, until "this world quickly began to fade...The direct connection between the heavens and the earth became more difficult to see and, with it, the universal significance of our moment-to-moment lives. But by the very fact that spirituality was no longer forced upon us by the weight of external revelation, we became increasingly responsible for the spiritual content of our actions...making our choice to serve the Creator more meaningful" [5]. Our perception of the rose garden has been dulled, and conscious effort is now required to reinstate it. We have to generate new fragrance to reverse the adaptation, new light to puncture the darkness.

The important thing to remember is that just as the stimuli of the rose garden did not recede in reality, rather perception, so too the source of spiritual clarity is not absent, rather not perceived. G-d is not dead, He is hidden. What is it in the pathway of our lives that is dampening the signal? How can we reverse the adaptation?

The word *cheit*, often translated as "sin," really means a "miss", like an arrow missing the bull's eye [6]; this is a dampened signal, a transmission hindered, desensitization. The word *mitzvah*, often translated as commandment, is etymologically related to the concepts of "together" and "partnership" [7]; this is a full transmission, a sensitization. With our actions, we choose to key into or out of G-d consciousness.

Diminishing spiritual awareness entails not only an adaptation to the positive stimuli, but a habituation to the negative ones. Just as we eventually tune out the roses, we also adapt to the gym socks. In the former of these two processes, we are vulnerable to the *passive* dulling of our spiritual sensitivity due to over-exposure to *positive* stimuli. In the latter process, we *actively* dull our sensitivity by allowing ourselves to habituate to *negative* stimuli; fortunately, the immune system teaches us how to keep out unwanted invaders.

The ancient Greek historian Thucydies, in describing the Peloponnesian War of 430 B.C.E., reports that when a plague struck in Athens, those fortunate enough to recover from the illness were put to work caring for the sick. People observed, in other words, that immunity followed first exposure [8]. We are all familiar with the rarity of twice contracting chicken pox. This is because the body is carefully outfitted with a defense team of lymphocytes, the soldiers of the immune system, that work to not only combat a pathogenic agent but also to "remember" it for next time.

When a pathogen, called an antigen, enters the body, it is recognized by lymphocytes that fit its particular shape. When the match occurs, the lymphocytes can bind to the antigen and destroy it. The first time a particular antigen enters the body, however, the immune system is not yet equipped with lymphocytes prepared to fight it. When a new cluster of B and T lymphocytes recognizes the antigen as being "non-self" and therefore an invader, it is activated to divide in a process called clonal expansion. The newly formed lymphocytes are genetically coded to take on a shape that will match that of the antigen. They differentiate into either effector cells or memory cells. The former enact the current immune response, called the primary immune response, and die soon after. It is the memory cells, however, which stick around for a while, reproduce, and keep alive the "memory" of what the antigen looked like should it strike again. A secondary immune response could then quickly occur. Therefore, while the immune response to the first exposure may have taken days, subsequent responses to that antigen will occur far more rapidly. The body has gained an acquired immunity to that antigen and will be ready to fight it in the future [1, 2, 9].

On the spiritual plane, it behooves us to deal with invaders the first time they cause us to stumble. We would be enacting a "primary response" that would make it far more difficult for the invaders to triumph the next time around. In *Michtav M'Eliyahu*, Rabbi Eliyahu Eliezer Dessler explores the question of how Kain remained a prophet even after killing his brother. How was his sensitivity to G-d not dulled by a spiritually destructive act of such monumental proportions? How was prophecy still possible? In answer, Rabbi Dessler delves into the commentary of the Vilna Gaon on the statement of the *Gemara* in *Yoma* that *"rishonim nitgaleh avonam"*, those of the early generations revealed their sin. In other words, the luminaries of the early generations had challenges just as we do (albeit on a vastly different level), and sometimes they even failed. Unlike those of the later generations, however, they immediately bounced back. They "revealed their sin," refused to ignore it, and repented straight away. They did not allow their sensitivity against sin to be dulled; they halted adaptation in its tracks. If sin is not stopped, one becomes so accustomed to it that it seems to him as if it is permitted because he forgets that it is a problem at all. Though Kain killed his brother, he repented immediately and did not let himself spiral into more sin and self-destruction [10].

As we see with the memory cells, part of a full victory in battle means remembering the tactics for next time. So too, the *Rambam* writes in *Hilchot Teshuva* 2:1 that an inherent part of *teshuva* is not repeating the sin, should one find oneself in the exact same circumstances in which he previously stumbled. Like King David, a quint-

essential representative of the earlier generations, who declared in *Tehilim* 51:5 that "*chatati negdi tamid*- my *cheit* is before me always", even after complete *teshuva* we must remain on our guard in the future as well, in order to avoid complacency in odious situations. In this case as well, preventing adaptation means perpetual input of effort.

Thus, we have seen that much like the body, our spiritual lives operate according to an elegant logic. In refusing to adapt to negative influences, we determine to avoid spiritual decline. If we make the choice to invest effort into new stimulation, we will raise ourselves to greater depths of clarity. Indeed, the path to awareness is in our hands. ■

ACKNOWLEDGEMENTS

It is with great appreciation that I thank Rabbi Jeremy Kagan, Rabbi Ely Allen, and Dr. Harvey Babich for reviewing my articles. Thanks also to Shira Koenigsberg for taking the time to help me sort through an unruly mass of tangled ideas. At the risk of sounding terribly cliché, I must say that to my parents, of course, I owe endless gratitude for believing in me and supporting my dreams.

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TEETH IN THE TALMUD – A HALACHIC DISCUSSION

NECHAMA CITRIN

The interface between dentistry and *halacha* presents itself on many occasions. Dental fixtures, such as crowns and permanent fillings, are of particular interest in *halacha*, and thus, are discussed in Talmudic sources. Such *Halachic* sources involve topics such as the prohibition of carrying on *Shabbos*, *chatzitzot* (separations) and women's immersion in a *mikvah* (ritual bath). These topics were important in the times of the Talmud and continue to have practical ramifications in the modern era.

The Talmud's discussion of dental fixtures concerns the area of dentistry specializing in the restoration and repair of teeth that were broken, worn, or decayed: prosthedontics. Injury, disease, and aging can contribute to the decay of teeth. In the restorative process, prosthodontists employ a wide variety of dental fixtures including dental implants, crowns, bridges, dentures, veneers, and inlays [1].

Prosthodontic fixtures serve many functions. Crowns, commonly referred to as caps, serve as a covering placed over a tooth. Crowns serve a number of restorative purposes including the protection of chipped, cracked, or sensitive teeth, and decayed or worn fillings. Also serving cosmetic purposes, crowns enhance the appearance of teeth that may be abnormally shaped, positioned, or colored. A dental procedure, such as a root canal, can cause teeth to become prone to cracking, and thus, the protection provided by a crown may be a necessity. Additionally, the positioning of a bridge in the place of missing teeth may require the placement of crowns on the teeth surrounding the bridge as a form of support for the added teeth. A crown can be composed of a variety of materials including full porcelain, porcelain and metal, and full metal [2].

The topic of prosthodontics is found in the Mishna. In the sixth chapter of the *Mishna Shabbos*, a discussion regarding carrying on *Shabbos* is recorded. The Mishna states: "... An artificial tooth and a gold tooth, Rabbi Meir permits and the Sages forbid". Rabbi Meir and the Sages disagree regarding the permissibility of a woman wearing a prosthetic tooth in a *reshus ha'rabim* (public domain) on *Shabbos*. Rabbi Meir permits this action, while the Sages prohibit it. Some commentators describe the "gold tooth" in terms very similar to a modern dentistry's crown, both in structure and in function. Rabbi Ovadia of Bartenura (Italy, 1450 – 1510) comments that the "gold tooth" referred to in the Mishna is one that had mold growing on it due to decay and was covered in gold as a method of treatment. In his book "Comments on the Mishna," the Rambam describes the "gold tooth" as a " gold cover in the shape of the tooth put on a tooth with a strange appearance to conceal the defect" [3].

The Jerusalem Talmud discusses the permissibility of walking in a *reshus ha'rabim* while wearing prosthetic teeth. The Talmud records, ". . . She is still ashamed to say to the "*nagra*" (carpenter), I have lost my tooth, it has fallen out, make me another one. . ." Rashi explains that the "tooth" refers to "a false tooth made of wood." It can be understood from this Talmudic passage that false teeth were wooden. Combined with the *Mishna* in *Shabbos*, it is apparent that false teeth were golden, silver, and/or wooden [3].

Various explanations are offered for the prohibition against wearing artificial gold teeth in public on *Shabbos*. Rashi explains that gold is of greater monetary value than silver, and a woman may therefore desire to show off her gold tooth to her friends. This may lead to the removal of the tooth and the subsequent violation of the prohibition of carrying in public on *Shabbos* [4]. Another scenario proposed in the Talmud is based upon an opposite premise than the one offered by Rashi. It is explained that a woman may be embarrassed to wear a false tooth in public, fearing the scorn of her friends. These fears may lead her to remove her false tooth and hold it in her hand. She may forget about the tooth and walk in public on *Shabbos* while carrying it in her hand [5].

There are Talmudic commentators who permit the wearing of an artificial gold tooth in public on *Shabbos*. They explain that there is no concern that the wearer will remove the artificial gold tooth to display it to her friends, because she will be suspended from doing so by the embarrassment associated with wearing an artificial gold tooth [5]. There are also commentators who are of the opinion that regardless of the great value of the artificial gold tooth, there is no need to suspect the opportunity for the violation of the prohibition

As the field of dentistry advances and new dental fixtures are created, the interface between dentistry and *halacha* will be exciting to follow.

of carrying in public on *Shabbos*. The Rambam states the opinion of Rabbi Judah who allows the wearing of artificial gold teeth on *Shabbos* and explains that the purpose of artificial gold teeth is to conceal rotting teeth. There is no suspicion that a woman would remove the artificial gold tooth to have her friends admire it, because this would publicize her diseased tooth and cause embarrassment [4].

The discussion continues with regard to artificial silver teeth. Silver teeth resemble natural teeth more so than gold teeth, and therefore the commentaries were not concerned that one with a silver tooth would violate the prohibition of carrying in public on *Shabbos* while wearing an artificial silver tooth [5]. The Rambam explains that an artificial silver tooth is not as apparent as a gold tooth and therefore one is allowed to wear it in public on Shabbos [4].

Another area in which dentistry and halacha interact is in relation to dental fixtures and the *halachic* discussion of *chatzitzot* and a woman's immersion in the *mikva*. Immersion in the *mikva* requires a completely clean body devoid of any foreign materials, *chatzitzot*, which seperate between the body of the person and the water. According to Torah law, there are two criteria that must be met for a *chatzitza* to invalidate an immersion. First the nature of the *chatzitza* must be as such that a person does not want the substance to be attached to her body and second, that the *chatzitza* is present over half of the person's body. If only one of these criteria is met, the immersion is invalid according to Rabbinic Law [6].

The *Rishonim* explain that a substance which one desires to have attached to her body is termed "an extension of oneself" and is not considered to be a *chatzitza* (Rashi, *Shabbos* 57a, s.v. Ha nami; Sukka 6b). With regard to undesired substances found on one's body, the substance is considered to be a *chatzitza* and would appear to invalidate an immersion in the *mikva* [6]

For an immersion in the *mikva* to be valid, the water must be able to flow inside one's mouth if open (*Nidda* 66b). Though it is not necessary for one to open one's mouth while immersing, the possibility of the water reaching the surface of one's inner mouth is required. Dental fixtures may act as barriers that obstruct the flow of water from reaching the teeth covered by the fixture. Question arises concerning the status of the fixture, as desired or undesired by the wearer. Dental fillings are not aesthetically pleasing and the wearer would prefer not to have them in her mouth. From this perspective, dental fillings would be considered an undesired *chatzitza* and would appear to invalidate an immersion in the *mikva*. However, a different perspective must be considered. Once one has a cavity, the need for a filling is apparent and the person desires the filling because of the specific function it performs. In this case, dental fillings are a desired *chatzitza* and would not appear to invalidate an immersion in the *mikva* [6].

The status of dental fixtures is discussed by many *acharonim*, including the Chochmas Adam and the Avnei Nezer. The Chochmas Adam explains that any undesired foreign particle that is attached to one's body for the purpose of the function the attachment serves, has the status of a *chatzitza* and invalidates an immersion in the *mikva* (*Binas Adam, Shaar Beis HaNashim: 12*). According to the Chochmas Adam, dental fixtures and dental fillings in particular invalidate one's immersion in the *mikva* [6].

The Avnei Nezer is among a group of *acharonim* who disagree with the view of the Chochmas Adam. The Avnei Nezer differentiates between permanent and temporary attachments on the body. He explains that a temporary attachment has the status of a *chazitza* as it is not termed an extension of the body. Dental attachments perform a specific function and remain attached to the body indefinitely. Thus, dental fillings are an example of a permanent attachment, and according to the view of the Avnei Nezer, they do not have the status of *chatzitzot* and would therefore not invalidate an immersion in the mikva [6].

The *halacha* followed today is that all permanent dental fixtures do not have the status of *chatzitzot* and would not invalidate an immersion in the *mikva*. Additionally, temporary dental fixtures that are correctly fixed and are irremovable do not invalidate an immersion. In contrast to permanent dental fixtures, all removable dental pieces such as dentures, and removable orthodontic fixtures must be taken out before immersion in the *mikva* [7].

This understanding of *chatzitzot* can be used to explain the discussion of *chazal* with regard to wearing a gold tooth in public. The Avnei Nezer (Yoreh Deah 259) explains that during the time of *chazal*, gold teeth were not permitted to be worn in public because at the period, false teeth were uncommon. Therefore, *chazal* were concerned that the wearer would be led to remove the tooth and carry it after being shamed by others. The Avnei Nezer continues and explains that *chazal* were not concerned with the gold tooth being a *chatzitza*. Therefore, gold teeth and all other correctly fixed dental fixtures are not considered *chatzitzot* and would not invalidate an immersion in the mikva [8].

The practical and everyday ramifications of dentistry and *halacha* are interesting to explore. As the field of dentistry advances and new dental fixtures are created, the interface between dentistry and *halacha* will be exciting to follow.

ACKNOWLEDGEMENTS

I would like to thank my parents for their unwavering guidance and support and my sister Chaya for her editing expertise. I would also like to thank Dr. Babich for being a constant representative of the synthesis of Torah and science both inside and outside the classroom.

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THE "LIGHT" OF CHAZAL

ARIELLA COHEN

There are many times when it becomes apparent that *Chazal*, in their infinite wisdom, knew much more about the natural world than a surface reading of their works might make it seem. Embedded in their *halachic* rulings and their exegesis on *Tanach*, is a wealth of subtle references to scientific phenomena that are surprisingly accurate. It is difficult to understand how *Chazal* arrived at their empirical conclusions, as much of the current scientific knowledge could not have been discovered without the use of modern technology. The keen insight manifested in their statements about the sun is just one of the many areas in which *Chazal* displayed an understanding far more advanced than that of the scholars of other contemporaneous cultures.

It is important to recognize that there are times in which *Chazal* make a statement about a natural phenomenon that does not correlate with the explanation set forth by modern science. Some have utilized such cases to discredit any scientific knowledge that can rightfully be attributed to *Chazal*. However, those who hold this view fail to consider the language of *Chazal*. Often *Chazal* describe a phenomenon in the way that the naked eye would have viewed it, macroscopically, instead of the way it may have viewed under a microscope or with some other vision enhancing technology. It is therefore sometimes difficult to interpret whether *Chazal* are explaining the inner workings of the universe or simply describing a process as observed by the human eye [1]. Additionally, many argue that nature was different at the time of *Chazal* and that their statements regarding the natural world may have been valid in their time. In any case, pointing out the times when *Chazal's* assessment positively correlates with contemporary scientific ideas is certainly a worthwhile endeavor.

To appreciate the depth of wisdom inherent in *Chazal's* statements about the sun, it may be useful to first engage in an analysis of the ideas about the sun held by contemporary cultures at that time period. Almost every culture during the time of *Chazal* worshipped the sun. The Mesopotamian society regarded the sun as a solar god and gave it names to reflect its status as such. In Sumerian society the sun god was known as Utu and was believed to posses the attributes of justice and "clarity of vision," while in the Akkadian culture the god of the sun was called Shamash. Likewise, the sun god was considered the most important of all the gods in ancient Babylonia. The name of the ancient Amorite King, Hammurabi (1792- 1750 BCE), is a testament, as modern scholars believe that the name, Hammurabi, was derived from the Semitic word for sun god, Hammu [2].

Similarly, the Greeks also displayed a great veneration for the sun. They worshipped both the physical sun and the "soul of the sun." They named the physical sun Helios and believed that it held the power to heal blindness. Apollo was the name assigned to "the soul of the sun" which was associated with music and general healing. This distinction between the physical and spiritual aspects of the sun and the dual sun gods that resulted from this distinction can be seen in the works of the ancient Greek philosopher, Plato. In his famous work, *The Republic*, Plato referred to two sun gods: "The good," Apollo, who was considered the more important of the two, and "the son of the good," the physical sun, Helios [2].

> Not only were *Chazal* ahead of their time, but they were also more advanced than the scientists who lived centuries after them.

Also noteworthy are the solar myths of the Canaanite nations that surrounded the Jews in the times of antiquity. Their sun gods, Moloch, Baal, Chemosh, Baalubzebub, and Thammuz, were representative of the pitiless mid-day summer sun. The Canaanites sacrificed their children to these merciless sun gods [3]. Scholars believe that solar mythology developed as a result of the pivotal role the sun plays in sustaining human life. This solar dependence caused the sun to gain the title of the most central and powerful god. The prestige bestowed upon the sun led ancient civilizations to closely monitor and observe the sun's daily movements and to develop myths to explain each one. Clearly impressed by the movement of the sun in the sky, the Egyptians and Assyrians named the sun, 'the runner,' and the sun was depicted with wings on monuments. The preeminent word for sun, "shamash," in the Semitic languages reflects the rapid motion of the sun during sunset and sunrise. In keeping with this, the Canaanites and Greeks offered horses as sacrifices to the sun god [3].

Not only did *Chazal* refrain from worshipping the sun and attributing supernatural powers to it, but they also understood a great deal about its formation. A case in point is the Biblical order of creation

of the sun and the earth. Today's physicists explain that the sun was created approximately five billion years ago and posit that the sun was created prior to the planet Earth. This may at first seem to contradict the order of creation presented in Genesis. According to the Torah, the sun and moon were created on the fourth day while the planet Earth and all of its greenery were created on the third. Furthermore, it is also very difficult scientifically to explain the greenery's existence without the sun and its photosynthetic-promoting properties. Rashi anticipates this difficulty and quotes the Talmud (Chagiga 12a), which provides a single answer to both questions. The Talmud explains that the sun was formed on the first day but was not placed into the heavens until the fourth day. Indeed, the sun was formed before the earth and could therefore trigger the process of photosynthesis. However, it was not until day four that the sun was commanded to position itself in the heavens. The text of Genesis and the current understanding of photosynthesis are therefore in complete accordance [4].

An additional instance in which the statements of *Chazal* regarding the sun are scientifically accurate is the *midrash* which discusses the sun and the moon, found in the tractate Chagiga. In this narrative, the moon complains to G-d about the coexistence of the sun and itself. G-d responds by diminishing the moon, whose original size was equal to that of the sun. This *midrash* is incredibly thought-provoking. The idea that the world was originally "destined to revolve around two luminaries" seems difficult to imagine as a scientific possibility. Dr. Isaac Gottleib of Bar Ilan University explains that this concept is not so far fetched. In fact, he argues that the *midrash* contains many allusions to the processes involved in the formation of the sun and moon [4].

Today, it has been established that the sun, like most stars, was created from a solar nebula, a cloud of gases gathered in space. The solar nebula from which the sun was formed slowly diminished and eventually collapsed to form a very concentrated gas. An extreme rise in temperature coincided with the collapse of this nebula and caused the hydrogen present to burst into flames, forming a star. During the progression of this process the nebula began to rotate. This rotation was termed "angular momentum" [4].

During the formation of a star there sometimes is more angular momentum that can be accounted for by the single forming star. It is therefore often the case that two stars are produced together forming a "double star." If there is still an excess of angular momentum even after the double star is created, additional planets form around the double star [4].

Attempt to understand the dialogue presented in the *midrash* in *Chagiga* in light of this scientific information: Dr. Moshe Kaveh, also of Bar Ilan University, suggested that moon implored G-d not to create a double star when creating the sun and the moon, as was usually the case, because the moon "believed" that it was not possible for two kings to share a single crown. G-d assented to the moon's request and only formed a single star, the sun, out of the solar nebula with nine planets around it to account for the excess of angular momentum. The moon was formed by causing a planetary body to collide with the Earth. This collision resulted in the destruction of the planetary body and of a portion of the earth's surface. The debris from both the Earth and this planetary body subsequently recombined to form the moon [4].

Kaveh's theory is also supported by the prayer that Jews recite each Shabbat morning: 'He called to the sun and it shone; He saw and regulated the form of the moon.' G-d first commanded the sun to shine through the formation of a solar nebula and only afterward created the moon through the aforementioned collision. One can infer from this excerpt that *Chazal* believed that G-d created the sun before the moon. Astronomers established this sequence of creation only recently and explained that the sun and the planets were created years before the moon [4].

The *halachic* rulings of *Chazal* about the use of solar power on Shabbos may also be evidence that they understood the sun in a way that coincides with modern science. The sages ruled that although cooking on Shabbos is prohibited under the *issur* of *bishul*, cooking in the sun, *bishul b'chama*, is not prohibited as it is considered an atypical form of cooking. However, the rabbis only permitted the direct use of the sun for cooking. They prohibited secondary solar heat, known as *toldat hachama*, because of its similarity to *toldat haish*, which is a secondary material, directly heated by fire and then used to cook another object. The reason for this extra precaution was that *toldat haish* is prohibited by the Torah. *Chazal* therefore prohibited *toldat hachama* as they wished to prevent a situation in which a person would observe an individual cooking in an item heated by the sun and believe mistakenly that it was heated by fire, and then mimic this action [5].

The fact that *Chazal* did not prohibit cooking directly in the sun implies that they did not view the sun as a traditional form of fire, *aish*. This is surprising as *Chazal* had neither the extensive knowledge of physics and astronomy available today, nor modern telescopes with which to observe the sun. They could only go by what they saw. It would be easy for one - without the aid of modern scientific knowledge and technological developments - to view the sun and perceive a giant fire. However, *Chazal* did not perceive the sun in this manner. Of course the possibility still exists that *Chazal* permitted cooking in the sun because they viewed the sun as a *halachically* permissible and drastically different form of *aish*, but even so, they did not view the sun as a literal ball of fire millions of miles away.

Currently, scientists believe that the sun is not a ball of fire in the way we traditionally think of fire. The energy released by the sun is created by fusion reactions using hydrogen and helium gases as fuel. The bonds between the hydrogen atoms are broken, causing them to release energy in the form of light and heat. The two isotopes of hydrogen present in the sun, tritium and deuterium, collide with each

other because of the high temperatures within the interior of the sun and cause the hydrogen atoms to fragment. These fragments later join to form helium. Another result of these collisions is the release of a tremendous amount of energy, which then travels from the center of the sun to its exterior, thereby generating light [6].

Not only were *Chazal* ahead of their time but they were also more advanced than the scientists who lived centuries after them. Our current understanding of the sun is very recent. In fact just over a couple hundred years ago the sun's ability "to sustain life" was discussed as a real possibility. Today, with the advent of new technology and more advanced research methods, the "habitability" of the sun is not even an amateur topic of discussion. In light of this utter lack of scientific understanding, the solar myths that many cultures so strongly maintained are much easier to comprehend and the scientific understanding that *Chazal* exhibited is all the more laudable [3]. ■

ACKNOWLEDGEMENTS

I would like to thank Dr. Babich and Rabbi Pahmer and Rabbi Swerdloff for all of their help in thinking about and writing this article. I would also like to thank my parents for their continuous encouragement and support.

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WHEN SCIENCE CONTRADICTS TORAH: HOW DOES THE HALACHIST RESPOND?

CHANIE DINERMAN

Many areas of Halacha rely heavily on scientific observations. Therefore, Rabbis have always been interested in the reality in which they live in order to apply the Halacha. What happens when it appears that a scientific theory of Rabbis in previous generations seems to be contradicted by the modern scientific belief? How does the halachist respond to a conflict between contemporary scientific theory and Halacha that is based on a reality that we no longer experience? Understandably, these questions have many far-reaching theological implications and practical applications that are far-beyond the scope this article. This piece will explore the approaches of a number of traditional authorities regarding these issues.

A set of mishanyot discusses the case of a *yotze dofen*, literally translated as one who emerges from the side. The first, a Mishna in *Brachot* [8, 2] deals with the status of a child as the legal firstborn if he is born as a *yotze dofen* and the child born after him is delivered naturally. Neither child is considered the firstborn since the legal firstborn must be both the oldest child and the child that opens the womb. In tractate *Kritut*, the Mishna [1, 5] discusses whether or not a woman who gives birth to a *yotze dofen* has to bring a sacrifice. Finally, a Mishna in *Niddah* [5, 1] presents a dispute as to whether a woman becomes ritually impure after giving birth to a *yotze dofen*.

The most reasonable definition for *yotze dofen* in all of these Mishnas is a child born through a cesarean section. To the medieval scholar these statements were difficult to understand. Scientific knowledge of the day claimed that it was impossible for a woman to survive a c-section. The first successful c-section that was recorded, in which the mother and child both survived, was in the year 1500 CE, long after the recording of the Mishna. If c-sections were a scientific impossibility, according to the scientific knowledge of the Rabbis of previous generations, how did they explain these mishnas which are predicated on the success of this operation? Rambam[1] therefore interprets the Mishna in *Brachot* as referring to a very specific case in which the mother is pregnant with two fetuses at the same time and the first child comes out through a c-section and the second one is delivered naturally. Rambam therefore preserves the most reasonable possibility that the mother can undergo a cesarean section and give birth to another child. Rashi, confronted with the same challenge, chooses to explain the term *yotze dofen* in an unusual way. In the Gemara in *Niddah*[2], Rashi explains the term: "By means of a drug her womb is opened and the fetus emerges and she recovers." Both Rambam and Rashi, when confronted with a text that seemingly challenges scientific reality, choose to give an interpretation of these Mishnas which does not conform to their simplest meaning to alleviate that contradiction. By doing so, Rashi and Rambam both preserve the ability to understand the Halacha within their reality.

Tosafot explore an alternative solution to solve a direct conflict between Halacha statements and observed reality. The first-born offspring of a kosher animal have a special halachic status and are therefore reserved for the priest. If a cow is purchased with no knowledge as to its prior history, how does one know if the calf it bears belongs to the kohen or can be used by its' owners? The Gemara in *Avodah Zara* lays down a principle that if the cow is three years of age or older, then the offspring should definitely be assumed to be the first born, implying that cows younger than three years old are not able to bear offspring. This statement bothers Tosafot because his contemporary reality dictated that cows were able to bear calves at two years old. To solve this apparent conflict, instead of creating a forced interpretation, Tosafot invoke the idea of *Shinuy Hatevah*, suggesting that nature has changed. This idea offers the possibility that the nature that Chazal observed was accurate and the discrepancy between their observations and what is experienced today is based on the fact that nature has evolved. This solution maintains the possibility that Chazal did have divine assistance when describing the world they

How does the halachist respond to a conflict between contemporary scientific theory and Halacha that is based on a reality that we no longer experience?

1 Rambam's commentary on the Mishna *Bchorot* 8,2

2 Niddah 40a

experiences. Reality has changed but the integrity of the Halacha remains. Whether the Halacha should change in that case is a complicated and interesting issue, which many great scholars have dealt with, yet which is beyond the discussion of this article.

The laws of *treifot* are heavily based on understanding of biological and physiological processes. For this reason, many conflicts between contemporary scientific theory and rabbinical statements arise when studying this topic. The Gemara in tractate *Chulin* comes to the conclusion that an animal with one of the forty-seven listed injuries will die within twelve months and is therefore characterized as a *treifa*. What if an animal with one of the defects listed lives for more that twelve months or if conversely we observe an unmentioned defect to kill animals within twelve months? While there is no consensus on the issue, many have grappled with it and offered various solutions.

There are those that adopt a skeptical approach concerning scientific theory in general. Science is forever changing; what is believed to be healthy today can be exposed as a carcinogen tomorrow. Why should the eternal corpus of Halacha constantly adapt to accommodate the scientific theories of the day? The *Rashba*[3] and the *Maharshal*[4] both take this approach. The *Rashba* in his responsa maintains that anyone who has observed an animal live for more than twelve months with one of the defects listed in the Gemara is either lying or witnessing a minor miracle. The *Maharshal* writes that the laws of *treifot* were formulated regarding the overwhelming majority and any deviations observed are minor exceptions and do not affect the rule. Although the *Maharshal* acknowledges the possibility of change to a greater degree than the *Rashba*, both reflect a skepticism about science and therefore a reluctance to address its' implications on the Halacha.

Alternatively, the *Chazon Ish* in *Yevamot* (57:3) acknowledges a difference between a modern observation and the reality described in rabbinical sources. The *Chazon Ish* explains that science today clearly demonstrates that animals have been forced over time to adapt to their surroundings and that evolutionary change overtime within a particular species is an observable fact. Therefore, it is possible that the realities that the Rabbis experienced and described can differ from today's realia. As a rule, therefore, Halacha should not be changed to adapt to modern day reality because Halacha is meant to be eternally based on the natural reality, as it existed as the time of the Mishna. Rabbi Elchonon Wasserman adopts a similar conclusion but states that once the Mishna and Gemara were canonized all decisions are final unless overruled by a later and greater *Sanhedrin*. Since that has not existed as of yet, the Halacha cannot be changed even if the scientific knowledge is found to be inaccurate. Both authorities accept the Tosafot's concept of *Shinuy Hateva*, a change in nature. According to Rabbi Wasserman though, the change of the Halcha could theoretically be possible in different conditions and the fact that we observe the Halacha based on reality we no longer experience is more of a technicality than a reason intrinsic to the system.

Rabbi Eliyahu Dessler suggests an original approach explaining the way the sages used scientific knowledge. The sages used science to interpret a received tradition. Accordingly, if the science is found to be flawed, a new explanation based on contemporary scientific theory should be explored to explain the received tradition. Rabbi Dessler uses the *Halachot* of *drusa*, an animal pierced by the nails of a predator, as an example to explain this approach. The Sages received the tradition from Sinai that a *drusa* is considered in the category of *treifa*, non kosher meat. The Gemara (*Chullin* 53a) explains that the *drusa* will die because its attacker is among the mentioned wildcats that secrete venom into its pray as it attacks. Chazal observed that animals scratched by wildcats were more fatally injured as compared than to those attacked by other predators. The Rabbis therefore reasoned that wildcats secret venom that causes the higher fatality rate. We now know that wildcats do not secrete any poisonous venom. Rabbi Dessler suggests that a new scientific explanation can be found to describe the phenomenon behind the Halacha. A wildcat's claws penetrate deeper into its prey's body and therefore more dirt is inserted that may cause infection and lead to a quicker death. Rabbi Dessler preserves the Halacha as well as the original observations of the Sages. This approach encourages the modern scientist to search for contemporary scientific theories that may underlie Chazal's observations.

A very small sampling of opinions has been presented and much is left for the reader to explore and study. Any Halachic decision must be made with a strong grasps of the development of Halacha in general and the entire halachic process and should be reserved for only the greatest Torah scholars. The information presented in this article suggests that the approach that many traditional halchists take has been to preserve the Halacha as much as possible while to taking into consideration discrepancies between rabbinical scientific observations and modern theory. There have been cases where decisions were made by great Torah scholars to adjust the Halacha based on the particular realities experienced today. Although no conclusive can be drawn from such a cursory analysis the issues that have been raised are fascinating and have many applications in both Jewish thought and law. ■

3 Respons I:98

4 Maharshal, Yam Shel Shlomo, *Chullin* (3:80)

ACKNOWLEDGEMENTS

The gratitude I feel towards my parents and Fran and Dovid Gidalowitz for their love, support and belief in my ability to achieve can not be expressed. Additionally, I would like to thank Dr. Harvey Babich who encourages his students to strive for excellence and always take the extra step.

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OBSTETRICS IN TANACH: AID IN THE FRUITION OF THE BLESSING FROM G-D

JENNIFER FATHY

A key milestone in a Jewish woman's life is having children. Indeed, it is a *mitzvah* to bear children. G-d commands Adam and Eve: 'Be fruitful and multiply' (Genesis 1:28). This is not only a command, but also a blessing, as reiterated time and time again in Genesis, the Prophets and Psalms [1]. Therefore, those who assist in the process of birthing are in fact aiding in the fruition of a blessing from G-d and the fulfillment of a *mitzvah*. While birthing is a very physical process, there are spiritual aspects to it as well.

Pain During Childbirth

After Adam and Eve sin in the Garden of Eden, G-d curses them (Genesis 3:16-17):

Unto the woman He said: I will greatly multiply thy sorrow (*etzev*) and thy pregnancy: in pain (*etzev*) thou shalt bear children...And unto Adam He said...cursed is the ground for thy sake; in toil (*etzev*) shalt thou eat of it all the days of thy life [2].

This wording comes from the Hebrew Bible with English translation published by Sinai Publishing in 1965 [2]. Helen Wessel, the author of "The Joy of Natural Childbirth" argues:

> When the *same* Hebrew word is translated as 'pain' for the woman and 'toil' for the man, it is clear that the translator's cultural beliefs have biased his judgment as a scholar of the text. The best description of giving birth is toil or labor! ... Rabbi Samson Raphael Hirsch explains that *etzev* is 'only a mental pain and hurt feelings or worry'[2].

Based on Wessel's argument, perhaps better translations of *etzev* in childbirth would be tension, anxiety, or nervousness. Commentators like S'forno and Rashi have suggested that the suffering in these verses refers not to the childbirth itself, but rather to the perpetual act of raising children. Humans, it should be noted, invest more time and effort in raising children than other species on this planet.

A further support of the idea that childbirth does not have to be painful is that in the Bible, labor pains and suffering are only mentioned with regard to Rachel, during the birth of Benjamin. No pain is mentioned in Eve's delivery of Cain, even though she was the one that was cursed with pain during delivery.

Also, expressions of joy are used when naming the babies at birth. Sarah, even at the age of 90 during her delivery of Isaac, does not mention suffering. She calls her son Isaac which means laughter, because 'G-d has made laughter for me; whoever hears will laugh for me' (Genesis 21:6). At the birth of Joseph, Rachel calls him Joseph saying, 'May G-d add for me another son' (Genesis 30:24). This is far from the cry of women in the throes of childbirth, who shout to their husbands in modern day movies — "I will never let you do this to me again!"

"Birth ... may be a deeply moving spiritual event, not just a sequence of body processes" [2] and a woman needs to go into her delivery with the opportunity to experience every feeling that this miracle can provide. In Judaism, unlike other religions, it is not sinful to have marital relations and to conceive a child, so any pain at birth is not seen as atonement for sins as with other religions. Therefore, there is no glory in pain. Secular sources echo this idea. In fact, ACOG [American College of Obstetricians and Gynecologists] believes that a woman's request for pain relief should not be denied at any time during labor" [3].

Therefore, those who assist in the process of birthing are in fact aiding in the fruition of a blessing from G-d and the fulfillment of a *mitzvah*.

An epidural block, a regional nerve block, is used in both vaginal and cesarean deliveries by inserting a catheter into the epidural space of the spine and the level of numbing can be controlled [3]. More than 50 percent of women giving birth have epidurals. It is the form of pain relief most commonly asked for by name, because of its relative safety. It uses less drug for the desired effect. Its administration is a simple procedure, and it provides local pain relief in the lower body. This allows a mother to be awake during birth and to greet the baby immediately afterward.

The only reason for a Jewish woman to avoid an epidural injection would be because of its potential danger, even though today this pain relief method is considered safe. There is no Jewish ideal for a woman to experience added pains of childbirth to atone for her sins.

The fear from "expecting pain and trauma at birth ... stimulates the sympathetic nervous system in a number of ways, causing a resistant cervix and muscle tension that inhibit labor and begin a spiral of pain" [2]. Pregnancy books today in fact advise not to think about and expect pain because these thoughts can increase the perception of pain [3].

With all this said, one cannot deny the fact that there is pain during childbirth. Midwife Adelle Dishaw says:

> I think [childbirth] is a spiritual experience, but people do not want to experience it; they want to get through it. If you are raised with the idea of instant gratification in which you do not have to wait for much and if you see on TV that you can deliver in thirty minutes, you do not expect to work hard. However, many people, especially religious people who have a lot of children, realize that it takes work to have and to take care of a baby. Today, people are afraid of this work and do not welcome it... Even people with a high tolerance for pain hurt. No one breezes through it, but every woman giving birth must realize that it is pain for a purpose and that she has to go with the pain [4].

The purpose is a child; the purpose is to have this blessing from G-d.

Rachel

Rachel's prayer for another child after the birth of Joseph was answered with the birth of Benjamin. This birth turns out to be one of the two, or, as some believe, three deaths of mothers during child delivery recorded in Tanach as well as the only one that describes the process of childbirth as being painful. One possible death during childbirth is Michal's, King David's wife. Her reason for death is not clear in the verse as it says: "Michal daughter of Shaul had no child until the day of her death" (Samuel II, 6:23). Rashi and the Midrash interpret this to mean that she died during childbirth while others believe this verse means that she bore no children after the incident surrounding this verse. Another possibility is to take this verse for its literal meaning that she died barren. Whatever the case may be, there is no mention of pain or a difficult delivery. Another death during childbirth is that of Eli's daughter-in-law, who goes into labor upon hearing of Eli's death, and seems to disregard her delivery and is not comforted by her child's birth [2]. The name she gives him is Ichabod, because "the glory is departed from Israel, for the ark of G-d is taken," referring to her father-in-law, and not her delivery or new son [2].

Rachel's second delivery is not like the above mentioned two deliveries. Her labor is described in Genesis 35:16-18:

> Rachel gave birth, and had difficulty in her childbirth. And it was when she had difficulty in her labor that the midwife said to her, 'Have no fear, for this one, too, is a son for you.' As it came to pass, as her soul was departing – for she died – that she called his name *Ben Oni*, but his father called him Benjamin.

"The death of the matriarch Rachel in giving birth to Benjamin had remained without a satisfactory obstetrical explanation until our time." If these verses are read in the original Hebrew or in an accurate translation (as above), the obvious diagnosis of the fatal obstetrical complication can be determined based on the baby's sex determination by the midwife before the completion of birth. Such a determination can only be made during a breech delivery where the breech- buttocks, perineum and genitalia- are delivered first, and the sex determination is made before the head is delivered. Such a labor is prolonged and can result in fatal hemorrhage or infection [5].

Today, if a baby is in a breeched position, a trial of labor is sometimes allowed with extensive monitoring and "everything (and everyone) is in readiness for an emergency surgical delivery should one suddenly become necessary" [3]. A breeched baby delivery still incurs a lot of danger. The emergency surgical delivery is called a cesarean section and most doctors do not even risk the chances of complication. When Dr. Rebecca Weprin, an obstetrician, was asked if all breeched babies are delivered by cesarean section, she responded: "absolutely... we have come a long way with regard to c-sections" [6].

Midwives

In the twentieth century, most women in Western countries shifted from midwife delivery at home towards delivering in hospitals with obstetricians and the possibilities of skilled medical interventions during difficult deliveries [1]. With the arrival of the twenty-first century, however, "a spiritual revival is taking place among Jews. An increasing number of Jewish women and midwives are seeking to retrieve the spirituality of childbirth that existed in the past but which was lost in the medicalization of childbirth that occurred over the last hundred years" [1]. Many midwives today are actually delivering in hospitals and let their patients choose to have a more comfortable delivery position with the knowledge that if there are complications, a doctor and a operating room are not far away. Many view this as the best of both worlds.

The classic example of midwives in Torah are the midwives Shifra and Puah, who were ordered by Pharoah in Egypt to kill all Hebrew male infants at their time of birth. They, however, did not listen. "The midwives feared G-d and it was that they did not do as the king of Egypt spoke to them, and they kept the boys alive" (Exodus 1:17). They were rewarded with the houses of priesthood and the tribe of Levi and royalty (Rashi, Exodus 1:15-21). These women, mentioned in only seven verses, are considered heroines and "whenever the importance of saving life is discussed, Shifra and Puah are recalled, for by preserving the live of Jewish newborns, they saved the children of

Israel" [7]. Women helped women in ancient birthing customs and the birth process and women's needs during childbirth today are essentially the same as before. We have come a long way from the days of Shifra and Puah as far as technological advances such as monitors and medications, but the desired outcome is unchanged, healthy mothers and their infants[7].

While today women utilize obstetricians as well as midwives, their goal, of healthy mothers and their infants is the same, and the importance of both obstetricians and midwives is still the same as it was in ancient times. Obstetricians are the primary health providers for women and many women go to their obstetricians before any other doctor, no matter what the problem. Judaism praises midwives for their wisdom and knowledge, as we praise both our obstetricians and midwives today. These obstetricians and midwives are the ones that make it possible for us to have the fulfillment of the blessing 'be fruitful and multiply' (Genesis 1:28). ■

ACKNOWLEDGEMENTS

I wish to express my deepest gratitude and appreciation to my parents for their unlimited guidance, love, support, and encouragement throughout my life, as well as for their deep commitment to my education and help in achieving my full potential. You have always been there for me and made sure I have no doubt of your support in my future plans. Also, thanks Mommy for always being my editor-in-chief. Thank you Dr. Rebecca Weprin and Adelle Dishaw for all of your informative help in writing this manuscript. Thank you Rav Oratz and Tamar Snyder for reviewing this manuscript. Last, but definitely not least, thank you Dr. Babich for all of your help in researching this topic as well as your continuous assistance, guidance, advice and support.

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HOW CAN WE UNDERSTAND THE PERSONALITY OF KING SAUL?

ESTHER FISCHER

The personality of Israel's first king, Saul, is complicated. On the one hand, when leading the Israelites to war against the Ammonites, he successfully instills fear in the Jews by slaughtering an ox and distributing a piece to each tribe, promising that rebels would suffer the same fate. This scenario with the Ammonites shows that Saul is a brave and fearless warrior; in other situations, however, our first king seems to be weak and unconfident. For example, Saul is so plagued by insecurity that he blames the Israelites for his allowing the Amalekite king to survive, despite G-d's order to kill the entire Amalekite nation. He also blames the Jewish people for his having brought an untimely sacrifice to G-d. Due to this seemingly self-contradicting nature, most sources agree that King Saul suffered from a mental disorder, and modern psychiatry, with the help of DSM IV (the Diagnostic and Statistical Manual for Mental Disorders, ed. IV), may lead us with clues to a possible diagnosis.

When Saul's kingdom is taken away from him, David becomes his successor. The Navi states: "And the spirit of the L-rd departed from [Saul] and an evil spirit from the L-rd frightened him" (1 Sam. 16:14). David is brought in to play the harp, and Saul's troubles are alleviated: "David would take the harp, and would play with his hand, and Saul would be relieved ... and the spirit of evil would depart from him" (1 Sam 16:23). Such evidence points to the problematic nature of Saul's mental state. What is the "evil spirit" with which Saul is afflicted, and how can we understand Saul's actions in light of modern psychiatry?

As we are introduced to Saul, his most prominent personality trait seems to be his insecurity. As Samuel tells him that he is to be king, Saul answers: "Am I not a Benjaminite, of the smallest tribes of Israel? And my family the least of all the families of Benjamin?" (1 Sam 9:21) When Samuel is to appoint Saul as king of the Israelites, Saul hides among the baggage. Later, during the war against the Philistines, Saul is ready to kill his son Jonathan for having eaten of the honey, and thus having disobeyed his father's orders. However, Saul shows himself compassionate against Agag, the Amalekite king, and his cattle, but by doing so, disobeys the commandment to wipe out the nation of Amalek, and consequently, loses his kingship. These actions show us that Saul has misdirected feelings of compassion: he is compassionate when he should not be, and he is overly cruel when he should have mercy. This is most likely an indication of his insecurity, as he is not sure what emotions are appropriate for the situation. After David kills the giant Goliath, Saul starts hating David and attempts to kill him: "the evil spirit from G-d rested upon Saul ... and Saul cast the spear, and said: "I shall pin David to the wall" (1 Sam. 18:10,11). Saul pursued David for the rest of his life in order to kill him. Thus, it is quite evident that Saul's personality revolves around insecurity, jealousy, aggression and paranoia.

Liubov ben-Noun [1], a well-known Israeli psychiatrist, considers four possible diagnoses to explain King Saul's behavior: major depressive disorder, mixed episode of mania and major depression,

Due to this seemingly self-contradicting nature, most sources agree that King Saul suffered from a mental disorder

bipolar I disorder, and dysthymic disorder. Of these diagnoses, he finds bipolar I disorder to best conform to the symptoms described. Bipolar I disorder is characterized by one or more manic or mixed episodes in which the patient experiences rapidly fluctuating moods, ranging from persistently elevated or irritable moods to sadness consistent with major depression [2]. Ben-Noun argues that when Saul casts the javelin to kill David, he is experiencing a manic episode which causes him to feel irritable, have a decreased need for sleep, lose his ability to concentrate and experience feelings of aggression. The manic episode also causes him to experience hallucinations, explaining why Saul is under the impression that David was after him. The idea that Saul at times suffered from major depression comes from the description of the evil spirit which causes him to experience negative emotions to such an extent that they evolve into delusions against David.

In contrast to the opinion of ben-Noun, H. Shy [3] considers Saul to have suffered from melancholia and/or epilepsy. Melancholia is equivalent to a diagnosis of major depression, and DSM IV describes it as a depressed mood over a prolonged period of time. Such disorders are reflected in diminished interest in activities, changes in weight and sleeping patterns, fatigue, and feelings of worthlessness[2].

Shy supports his diagnosis of melancholia with excerpts from the teachings of Nathan ben Yehiel of Rome, who states that the evil spirit refers to bad thoughts caused by the black bile (melancholy). Rashi also considers the evil spirit to refer to melancholy. However, in halachik texts, attacks of melancholia are compared to attacks of epilepsy. Shy therefore claims that we can not be certain if Saul's illness was of a melancholic or epileptic nature.

Julius Preuss [4] finds it problematic to ascribe a diagnosis of melancholia to Saul's behavior, as situational influences most probably contributed to his actions: Saul fought a constant battle against the Philistines, was reprimanded by the prophet Samuel, also his loyal friend, rejected by G-d, and was told that his kingdom would be taken over and given to someone better than him. He saw in David a rival, who would take over the throne, and he therefore attempted to kill him. Saul's three sons died in battle, together with a large number of his enemies. In the end, Saul committed suicide by falling upon his sword, an act, according to Preuss, motivated entirely by the situation, so that he would not be taken captive by his enemies and tortured to death. To explain the evil spirit, Preuss argues that Saul suffered from epilepsy. He supports this with the passage in which Saul goes to seek David, "[Saul] too stripped off his clothes ... and he fell naked all that day and all the night." (1 Sam. 19:24) Epilepsy is caused by abnormal electrical activity in the brain, resulting in seizures which can manifest themselves by loss of consciousness, and abnormal jerking and twitching of the hands and legs [5]. Saul's illness was associated with long periods of intermission, which is why palace officials thought that David' playing of the lyre healed him of his symptoms.

Most scholars agree that King Saul can be thought to have suffered from a mental disorder. The diagnoses most attributed to him include bipolar I disorder, melancholia, and epilepsy. Although a conclusive diagnosis can never be reached due to a lack of further evidence such as familial history, for example, it is interesting to observe that modern psychiatry may provide us with an insight into famous biblical personalities, allowing us to better understand the actions of the figures in Tanach. ■

ACKNOWLEDGEMENTS

I would like to thank my mother, Dr. Tehila Fischer, for her help with identifying psychiatric diagnoses; Rabbi Saul Berman for editing my manuscript for its Torah content and Deena Rabinovich for all her support and help and for inspiring me to write this piece.

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DEATH BY JEWISH LAW: A QUESTION OF BRAIN, BREATH, HEART, AND SOUL

ADEENA GOLDSTEIN

Within the time span of a mere nine months, a single-celled zygote divides infinitely, giving rise to all the tissues, organs, and organ systems that compose the human body. While the general mode of cell differentiation is well known, the order of organ creation remains more esoteric. Postulates of various philosophers concerning the initial organ to develop include the big toe, the head, the heart, and the liver. Just as there is lack of agreement as to the order of organ creation, there are also diverging opinions concerning the order of organ decay upon death. While Aristotle believed the heart to be the first organ to arise and the last to depart, Plinius deemed the heart the initial organ to perish [1].Though the philosophers were unable reach an over-riding consensus concerning the sequence of organ creation and death, Jewish law provides an unwavering answer.

Talmudic teachings (Niddah 31a) assert that man, woman, and God all have vital roles in the creation of a human being. While the father's sperm is essential in the creation of the bones, nails, brain fluid, and white of the eye, the mother endows the child with the skin, flesh, blood, hair, and black part of the eye. Finally, God bestows the child with the soul, beauty, sight, hearing, speech, movement, and mental capabilities. Upon death, God reclaims his gifts, but the parts of man imparted from his/her parents are left behind [2].

While the parent's role in creation is limited to the child's physical attributes, God bestows the soul; the "organ" of individuality, capabilities, potential and freedom of choice. In absence of the soul, man's body would lack purpose and immediately become rancid and thus, the soul is the first "organ" endowed to man [1]; hence the instant of its departure would be indicative of death. Since every moment of life is priceless, even when of poor quality, [3] a physician must be absolutely certain of the souls' absence before declaring his patient deceased, and thus freeing himself from further medical responsibilities.

Given the absence of a medical procedure capable of establishing the absence of the soul, physicians must rely on less foolproof methods of establishing death. While cessation of all physical organ function is an undeniable indicator of fatality, the relatively recent invention of artificial respiration has complicated matters both according to Jewish law and secular moral standards. Currently, an irreversibly brain dead patient, unable to breathe independently, can be kept alive on a respirator, so long as his heartbeat continues. Is this patient truly alive and worthy of continued life support [4]?

While sustained artificial respiration until all organs cease to function is certainly a safe approach, other factors must be considered. First, the cost of preserving a brain dead patient is astronomical and may be better spent on a patient with a greater chance of recovery. Sensitivity to the patient's family and friends is another important consideration, for it is impossible for one to maintain a healthy emotional state when one's loved one is near death for an extended period. Finally, most essential with regard to Jewish law, is the question of organ donation. Brain dead patients who retain a spontaneous heartbeat are the only potential organ donors. Thus, waiting until termination of all the patient's organs, including his spontaneous heartbeat, before declaring death, would nullify his donor status and may have serious implications for the patient eagerly awaiting a transplant [4].

> Being that there are physical organs that support the soul, death of such organs would be indicative of the soul's departure.

While irreversible absence of a spontaneous heartbeat was the traditional approach to defining death, the possibility of organ transplant triggered the reevaluation of the previously accepted definition [5]. After revisiting the subject of death in conjunction with the current medical advances of 1968, the "House of Delegates of the American Medical Association" adapted the traditionalist approach. They declared death to be based on the assessment of both the patient's physician and a second physician, who must utilize all possible medical tests to make an ethically sound decision [6]. That same year, the Harvard Medical School committee hinged the definition of death on the cessation of brain activity rather than on the absence of a spontaneous heart beat. According to the "Harvard Criteria," a brain dead patient can be declared dead as long as the patient does not respond to painful or external stimuli, lacks spontaneous respiration, is void of brainstem and spinal reflexes, proves incapable of decerebrate responses (unconsciously moving upper body parts), and his

brainwaves produce a flat EEG [5].

A few years later, in 1981, the "President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research" replaced the "Harvard Criteria" with a new set of standards. Meshing the traditional and modern definitions of death, the Commission declared that one is dead if he or she has either suffered from irreversible cardiac and respiratory dysfunction or irreversible brain death in both the cerebrum (upper brain) and the brainstem (lower brain) [4]. Receiving messages from both sides of the body and serving as "the seat of consciousness," the cerebrum must be in a coma. Additionally, the brainstem, the regulator of breathing, consciousness, and body temperature, and the connection point to the upper hemispheres, must have also malfunctioned. Since respiration is dependent on the brainstem, absence of respiration displayed through apnea testing, is a definitive sign that the brainstem has failed [4]. Additional substantiation for brain death can be accomplished through an EEG of the upper brain regions, evoked potentials of the cerebrum, and confirmed absence of blood flow to the brain.

Through employment of such medical evaluations, the secular physician can be nearly certain as to his level of compliance with the "Harvard Criteria" and/or the "President's Commission," but how does the Jewish physician determine the conclusion of his or her medical responsibilities to the patient? Since it is impossible to directly measure the soul's presence, Talmudic teachings and rabbinical authorities have provided an indirect way to be certain of the soul's absence. Being that there are physical organs that support the soul, death of such organs would be indicative of the soul's departure.

According to the Rambam (Mishna Erchin 20a) the organs upon which the soul relies include the heart, the brain, and the liver. Thus, the death of all three of these vital organs would certainly deem the person dead. Difficulty arises when the status of an individual with malfunction of only one or two of these organs is considered. One opinion of Rabbinic authorities states that the moment one of these three organs ceases to function, the patient is declared dead. Others believe that the cessation of one of these three organs marks the start of death, but the patient remains in a half-dead state until all three are no longer functioning [7]. Since it is forbidden to murder an individual in a half-dead state, [8] the patient cannot be deemed dead until all three organs cease. While the conservative approach would be to wait for the heart, brain and liver to expire, other factors such as cost of medical care, the emotional wellbeing of the patient's loved ones, and most importantly organ donation must be considered. Thus, one must look deeper into Biblical, Talmudic, and Rabbinic sources to ascertain whether halacha agrees with society's association of irreversible and complete brain dysfunction with death or whether other organs must have malfunctioned as well before fatality can be declared [2].

A Biblical source for death, based on absence of cardiac activity, is a biblical verse stating that "and you should love God with all your heart" (Deuteronomy 6:5). Upon this verse it is expounded that one must love God up until death which occurs when the heart ceases to function (Rabbenu Bahya) [10]. Additionally, substantiation for the role of respiration in conferring life is the Biblical verse "...all that had the breath of life in its nostrils" (Genesis 7:22) [8].

During a discussion of an instance in which it is permissible to violate the Sabbath, the Talmud also correlates death with absence of respiration and/or cardiac activity. The Mishna (Yoma 8:6-7) states that it is permissible to desecrate the Sabbath in order to save a life. Therefore, although it is generally forbidden to uncover debris on Sabbath, if an individual is caught under a collapsed building and it is unknown whether he is alive, one may uncover just enough rubble as to determine in the victim is alive or dead. If he is dead, no further debris may be removed, but in the case that he is alive, he may be completely uncovered. The Talmud brings forth two opinions regarding the amount of rubble that the rescuer may initially uncover; either until the victim's nose to check for respiration, or until his heart to determine the presence of cardiac activity (Yoma 85a), thus implying that the absence of respiration and/or cardiac activity is a sign that the soul has departed. The Rambam adds that a certain amount of time must transpire before declaring such a person dead, so as to be certain that he has not fainted. Additionally, Rabbi Sholom Mordechai Schwadron believes that the body must be completely still before concluding that the individual has died. Thus, according to Talmudic law and many contemporary Rabbinic authorities, one with permanent respiratory malfunction, lack of pulse, and absence of movement for half an hour is lacking a soul and thus may be declared dead [6].

While many modern day Rabbinic scholars continue to support the traditional approach of death by cessation of cardiac/respiratory functions, substantiation for life hinged on brain activity has surfaced as well. First, the Rambam (Hilchot Avel 4:5) writes of the importance of brain dysfunction in determining death. Additionally, Rav Moshe Feinstein's most recent opinion concerning death hinged on absence of brain activity is based on a second citation from the Rambam (Mishna Torah, Hilchot Tumat Met 1:15). The Rambam writes that a decapitated individual is considered dead even in the case that his limbs move for a short while after the decapitation. Certain that decapitation and brain death are equivalent, Rav Moshe asserts that lack of blood flow to the brain, a foolproof indicator of brain death, is sufficient evidence that the patient has died, even if the heart continues to beat. In an effort to explain the seeming discrepancy between his belief and the classical Talmudic approach, Rav Moshe evaluates the traditional opinion in the context of the case brought down by the Talmud. Since the Talmud speaks of a victim whose status is unknown, it concentrates on respiratory and

cardiac activity; both visible indicators that the person may be alive. Meanwhile, with today's medical technology, the condition of a hospital bound patient is usually well known, and thus instead of searching for indicators of life, the goal is to determine the conditions that connote death. According to Rav Moshe, once medical technology has confirmed the absence of blood flow to the brain, the patient is certainly dead regardless of any cardiac activity. Hence, Rav Moshe's view indicates that death according to Halacha occurs before all bodily organs cease activity [10].

In agreement with Rav Moshe's position, Rabbi M. Tendler equates cardiac activity in a brain dead patient with the spontaneous movements of the limbs of the decapitated individual mentioned by the Rambam. While brain dysfunction is indicative of death, cardiac activity is simply cellular action that may continue after death as long as the required nutrients are obtained. Rabbi Tendler also notes that the absence of spontaneous respiration is a clear indicator that the entire brain is dysfunctional, [10] thus asserting that upon absolute neurological and respiratory dysfunction, the soul exits the body.

While Rabbi Tendler seems to maintain that the brain serves as the primary support for the soul other Rabbinic authorities strongly disagree. Rabbi Aaron Soloveichik asserts that absence of spontaneous respiration marks the beginning of death, but the person remains semi-alive until long as all functions controlled by the brain cease to function. Even if a person is 'half-alive', any procedure that will accelerate death is forbidden, and the physician still retains medical responsibility [6]. This approach would imply that the soul is supported by all bodily organs, and thus, retains a presence in the body until all organs terminate function entirely.

While all Rabbinic authorities agree that the classical Talmudic approach maintains that upon the absence of cardiac and respiratory activity the soul has departed, evolutions in scientific knowledge and medical technology have spurred the analysis of this definition in conjunction with contemporary times. Today, it is known that under conditions such as hypothermia and drug overdose one may appear to be void of both cardiac and respiratory activity, yet remain very much alive. Thus, contemporary authorities who uphold this approach add that a significant amount of time must lapse before confirming death, and the physician must make every possible attempt to awaken the patient [6]. Since testing for brain death is now possible, others believe that the technological confirmation of absolute absence of brain activity is sufficient in declaring death and consequently the departure of the soul. Still, other opinions maintain that one cannot be declared dead until all bodily organs are lifeless, implying that every organ provides support for the soul [10]. While there is clearly no over-riding consensus regarding the moment of death, such subject matter seems worthy of ambiguity. When the life of the soul is at stake, even a minute measure of uncertainty is enough to warrant further life support. ■

ACKNOWLEDGEMENTS

I wish to express my deepest appreciation to my parents for their boundless guidance, support, and love. Additionally, I want to thank Rabbi David Gorelik for editing the Torah content and Dr. H. Babich for taking the time to review this article.

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THE DISTRESS OF OSTEOPOROSIS IN THE JEWISH COMMUNITY

SHAINA KATZ

Lifestyles of religions and cultures tend to be inclined towards specific community issues, stemming from the customs and practices deemed essential to their existence. Some cultures have rituals and laws that are detrimental to their health, but impossible to discontinue since it is damaging to their belief system. Modesty in dress, as practiced by Orthodox Jewish women, may be a possible risk to developing osteoporosis and thus needs further evaluation.

Upon exposure to the ultraviolet light in the sunlight, precursor cholesterol molecule in the skin is converted to vitamin D. Vitamin D is first transported to the kidneys where it is modified. It then proceeds to the liver where it eventually becomes the hormone, calcitrol which promotes the absorption of calcium by the intestines. An adequate supply of calcium is needed to prevent osteoporosis (Mader, 2003). [6] Thus, the question to be discussed is whether the modest dress of Orthodox Jewish women predisposes them to osteoporosis.

"*Tzniut*" is the Hebrew term for modesty, pertaining to one's behavior, as well as to one's manner of dress. It is an aspect of Judaism that enhances one's spirituality and helps one connect to G-d. *Tzniut* entails dressing modestly to show awareness of G-d and to demonstrate respect and reverence of Him. Women are required to dress modestly by wearing attire that is not revealing and covering the elbows and knees. Although the focus of the laws of *Tzniut* is upon women, men are required to act and dress modestly as well. When one dresses and acts properly it enhances his/her relationship with G-d.Tzniut creates an atmosphere of holiness and integrity, permeating throughout life. The laws of *Tzniut* are derived from the requirements specified in the Torah and traditions that have been defined by the practice of Jewish women for generations.

The Mishnah in tractate Ketubot notes that it was customary for Jewish women to refrain from weaving in the marketplace. The Gemara explains that the actions of weaving usually caused a woman to expose her upper arms in public, which was considered to be immodest. Anyone who dresses immodestly violates the biblical prohibition of "You shall not put up a stumbling block in front of a blind person" (Vayikrah 19:14). By ignoring the laws of *Tzniut*, a woman is causing a man to violate the law forbidding him to view parts of a woman's body that should be covered.

Even though men and women must dress appropriately and act modestly, they must take into account issues regarding health concerns [1]. Osteoporosis, a disease that affects the skeletal system, occurs when the bones of the body have lost vital minerals. Calcium is needed to keep bones strong. Without it, bones throughout the body may become weak, brittle and susceptible to fractures. The bones most susceptible to osteoporosis are the hip, back and wrist bones. Osteoporosis is a serious health problem affecting approximately twenty million people in the United States. Since the disease causes the bones of the body to weaken, breakage can occur with the slightest movements like bending or lifting a heavy object.

The bones of the body grow as the body matures and old bone is replaced by new bone throughout childhood and young adulthood. During this time, the new bone is added faster than the old bone is removed. This causes the bones to become dense and large which reduces bone loss at this early stage of life. By age thirty the bones reach their peak bone mass. After this stage, the bone removal begins to occur faster than new bone production, which over time leads to bone loss. Bone loss is at its highest post menopause after which it progressively continues but at a slower rate.

> A person's spiritual growth cannot develop without proper maintenance of the physical body.

Some adults may develop a condition called osteopenia, characterized by low bone density, which can lead to osteoporosis, when the bone density becomes even lower. Low bone density makes the bones weaker and more brittle, causing a higher risk of fracture. If the bones of the body do not reach their peak bone mass during the years of development, osteoporosis becomes a greater risk. Possible fractures caused by osteoporosis can hinder a person's ability to lead an active life. Taking preventative measures by maintaining levels of calcium and vitamin D can keep the bones strong and prevent breakage. Calcium is the main mineral in bones while vitamin D promotes its uptake and absorption into the body.

Vitamin D levels are maintained in the population through exposure to sunlight, which induces the synthesis of vitamin D. Because of the modesty restrictions applied to the dress code for Jewish women, their skin exposure to sunlight may be minimal. This could

result in a decrease in synthesis of vitamin D, leading to minimal absorption of calcium. Jewish women should be aware of the risks of osteoporosis to prevent complications from this disease.

Calcium supplements and additional weight bearing physical activity are two ways of preventing osteoporosis [4]. Although prevention is important, it is also imperative to determine how widespread the problem of vitamin D deficiency is coupled to the absence of physical activity. A study done by Werner *et al.* (2003) looked at osteoporosis health related behaviors in secular and Torah-observant Jewish women living in Israel. Osteoporosis, as noted, may result in physical complications, including limited function, pain, social and psychological effects, such as the loss of independence, inability to work, decreased quality of life, low self esteem, which could result in depression. Despite these complications, osteoporosis is preventable. Many studies have shown that exercise, avoidance of smoking and adequate intake of calcium and vitamin D can help prevent the disease. Observant Jewish women who may have specific dress requirements and restrictions on certain physical activities may need to heighten their awareness of osteoporosis prevention.

Both orthodox and secular Israeli women participated in the above mentioned study. They were asked to report their health related behaviors, including their level of physical activity, whether they regularly engaged in sports activities, what types of activities, and how often. Since smoking can also affect the risk of osteoporosis, the women were asked if they currently smoked or if they did in the past. They were also asked to record how much alcohol they consumed weekly. Calcium intake of the participants was measured by the amount of dairy products and calcium supplements that were taken over the course of the week. Orthodox women participated in walking and general day to day physical activity, while secular participants were involved in a wider variety of activities including structured fitness programs and swimming. The differences might be due to a variety of factors. Orthodox women might have avoided participating in certain activities that require a more revealing mode of dress and difference in modes of exercise might have reflected differences in the socioeconomic status of the two groups of participants. Orthodox communities with significantly larger families may be of a lower socioeconomic status and therefore engage in functional physical activity rather than paying to join a professional fitness program. Yet, the incidence of osteoporosis was not significantly different within the two groups of women. Interestingly, there was a calcium deficit in both groups. The secular participants obtained knowledge of the importance of calcium through informative education, while the orthodox women acquired knowledge informally from family members and their social circles. Although the study did not demonstrate that dress was a factor of vitamin D deficiency, it did raise important issues regarding specific physical activity and its relationship to osteoporosis. Religious women are restricted in the forms of exercise that require immodest dress, thus impacting their choice of physical activity. However, as long as these women continue to participate in physical activities suitable to their lifestyle, they can maintain a healthy body. Apparently, there was no difference in the incidence of osteoporosis between secular and Orthodox Jewish women, albeit their differing modes of dress, exercise, and gathering of health information. Apparently dressing with *Tzniut* is not a health risk [2].

Interestingly, the modest dress code of Orthodox Jewish women has a distinct health advantage, as they are less prone to malignant melanoma (i.e., cancer of the skin) as demonstrated by two studies. The first study was conducted to compare the incidence of skin cancer between residents of Bnei Brak, an Orthodox city, with its neighbor city, Givatayim, a city populated by secular Jews and the second between residents of Jerusalem and two secular cities on the outskirts of Tel Aviv. Both comparisons noted that the incidences of malignant melanoma were significantly lower in the cities populated by Orthodox Jews (Vardi *et al.*, 1993) [5].

An additional study was done by Taha *et al.* (2001) which looked at the bone mineral density difference between the ultra-orthodox Jews and their secular counterparts. The bone mineral density of adolescent girls and boys from the ultra-orthodox Jewish community was significantly less than the secular individuals. Twenty seven percent of the adolescent boys in particular had very low values. The low value could be attributed to their lifestyle, which precluded the need to exercise. However, it is also possible that genetics may have been a contributing factor. This study does not conclude that studying in yeshiva for many hours, or other religious customs is a causative factor in osteoporosis but rather that, people should take their health into consideration. (The researchers are careful to note that every religious person does not lack vitamin D and does not necessarily participate in physical activity. Rather, the research intended to heighten the awareness of the public that, to be healthy, it is important to get sufficient physical activity and sunlight during the day [3].

A person's spiritual growth cannot develop without proper maintenance the physical body. The Torah states explicitly that one must take care of his/her body: "*vinishmartem meod linafshotachem*"(Devarim,4:15) "and you should take care of your body and soul vigilantly." Learning about activities to improve health is the first step to leading a healthy lifestyle. One should do everything deemed possible to keep him/herself in good health and the rest is up to G-d. ■

ACKNOWLEDGEMENTS

Thank you to my parents for their continued support and guidance.

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THE MOUTH IN HALACHA

CHANIE LADAEW

Throughout the Torah there are several *halachic* issues with regard to the mouth. *Halacha* is a system of laws that addresses religious obligations that pertain to observant Jews [1]. Concerning the mouth, several *halachic* issues are debated amongst the *chachamim*, sages. Examples of such topics include immersing in the *mikvah*, (ritual bath), carrying a gold or a temporary tooth on *Shabbat*, having bad breath, brushing ones teeth on *Shabbat*, and waiting between meat and dairy.

According to *halacha*, on the seventh day following menstruation, a woman performs *tevila*, bodily immersion, in a ritual bath known as the *mikvah*. Until the purification process is complete, marital relations are forbidden. The majority of the woman's body must be covered by the *mikvah* water and she must avoid any *chatzitzah*, physical barrier, between her body and the water. Although one's mouth remains shut while immersed in the *mikvah*, a *chatzitzah* in the mouth is forbidden [3]. While permanent braces, fillings and prostheses are not within the category of *chatzizah*, removable dentures and temporary orthodontic appliances must be removed prior to the immersion [1].

Question arises as to whether a gold cap on ones tooth is considered a *chatzitzah* [2]. According to the *Daat Sofer*, a woman is permitted to immerse with a gold cap, but not with a silver cap. The *Avnei Nezer* (*Yoreh Deah* 259) disagrees, stating that immersion with either type of cap is permissible. These differing opinions are based on the fact that one is not permitted to carry a gold tooth on *Shabbat* from *reshut hayachid*, a public domain, to *reshut harabim*, a private domain. Years ago it was uncommon to have a false tooth, and therefore one with dentures was prone to embarrassment. Such humiliation was likely to cause him to remove the false tooth and carry it on *Shabbat*, an action that is prohibited. According to the *Daat Sofer*, a silver cap is not considered a *chatzitah* because it appears more similar to the actual tooth than one made of gold, and therefore one would be less likely to remove it and carry of *Shabbat*. On the other hand, the *Avnei Nezer* believes that both gold and silver caps are not considered a *chatzitzah*, as their purpose is to protect the tooth.

In the *Mishna Shabbat*, *Rabbi Meir* permits one to wear an artificial or a gold tooth on *Shabbat* but the sages forbid such behavior. There is also disagreement as to whether one can carry a false tooth in the public. According to *Rabbi Obadiah Bartenura* the artificial tooth referred to in the *mishna* is a denture. The tooth had to be plated in gold due to growth of a mold, thus implying that tooth decay was correlated with the growth of mold [7]. According to the *Rambam* the artificial tooth described in the *mishna* refers to a discolored tooth stained by dentin caused by degraded blood cells [7]. In this case, gold crowns were used to restore the tooth. According to all the opinions listed above, a gold crown is not considered as a *chatzizah*.

Another *halachic* issue with regard to teeth is halitosis, a common condition of bad breath. It originates in the mouth, with the tongue being the major source of the malodor. Oral malodor is caused by bacterial breakdown of food within the oral cavity. When glycoproteins are deglycosylated by Gram-positive bacteria, the resultant amino acids are further metabolized to end products with nasty odors [4]. Additionally, ketone bodies created by the rapid hydrolysis of triglycerides create a pH imbalance, causing a bad odor characterized as fruity and acetone smelling. This condition, termed ketosis, occurs during dieting and in uncontrolled diabetes mellitus [4]. Factors that increase the likelihood of developing bad breath include dryness of the mouth, fasting, and sleeping [4].

> Once a dental emergency is classified as a *pikuach nefesh*, life threatening, a dentist can do anything for his patient's care.

According to the *Talmud*, bad breath is considered a disability. A man who divorces his wife due to her bad breath is not required to pay the amount stimulated in the *ketuba*, the marriage contract. On the other hand, if the woman wants to divorce her husband because of his bad breath, then he must give her the agreed amount written in the marriage contract. A woman is not permitted to chew a mint at all times when having contact with her husband. However, as a cure for halitosis, a woman may go into the public domain on *Shabbat* with a peppercorn or a globule of salt in her mouth.

While generally one may use a peppercorn or a globule of salt on *Shabbat* to improve one's breath, a *kohen* is forbidden from doing so [4]. Additionally, a *kohen* with oral malodor cannot work in the *beit hamikdash*. Further, if he is missing teeth, if his lower jaw is stretched beyond the upper one, and if his mouth is weak and saliva is dripping, perhaps as a result of paralysis of the facial nerve, he is not permitted to serve in the *beit hamikdash*. [4].

An important aspect of *kashrut* in *halacha* is waiting between meat and dairy products. The *halacha* requires the individual to wait a period of up to six hours after eating meat before one can partake in dairy products because six hours are required to be certain that the taste of meat has dissipated from the mouth. The reason it takes a long time for the taste of meat to dissipate is because saliva lacks proteolytic enzymes and meat (i.e. bovine skeletal muscle) is difficult to digest [6]. If meat is found in between ones teeth even after the period, it must be removed prior to eating dairy [6].

With regard to emergencies on *Shabbat*, *halacha* states that human life takes precedence over all the commandments except for idolatry, murder and incest [8]. Which dental emergencies allow an observant dentist to set aside all *Shabbat* laws? There is a debate over whether *Shabbat* is considered as *hutra*, abrogation, or *dechuya*, suspension. If the *Shabbat* is *hutra* then one can do anything necessary to help his patient. On the other hand, if the *Shabbat* was *dechuya*, a dentist can only help one if patient's situation is *pikuach nefesh*, life threatening. Furthermore, if the *Shabbat* is *hutra* there is no need to go to a non Jewish dentist. Seek a non Jewish dentist. The concept of a *shinuy*, performance of an act on *Shabbat* in an unusual way, does not have to be done if *Shabbat* is considered as *hutra*. However, if it is *dechuya*, then a *shinuy* is required. What is considered as a *shinuy* for a dentist? It is not feasible for a dentist to perform a *shinuy* because it includes an act of being less successful or the method of the act must be tedious which is not practical for a dentist.

Once a dental emergency is classified as a *pikuach nefesh*, life threatening, a dentist can do anything for his patient's care. *Halacha* allows one to violate the *Shabbat* for any internal sore, defined as a sore from the lip or teeth inward, with the teeth are included. In addition, conditions such as tooth abscesses, jaw swelling, and gum infections are classified in the category of internal sore. In such cases, the *Shabbat* laws must be put aside. If one is suffering from mild dental pain, the *Shabbat* laws may not be desecrated. If there is loss of function, rabbinic, but not biblical, prohibitions may be transgressed. If there is moderate pain and no real danger, only the prohibition of telling a non-Jew to act is suspended and needed action can be done [8].

Understanding these *halachot*, jewish laws, not only allows Jews to act correctly when necessary, but also teaches an important lesson in Judaism: even the most minuscule problem, for instance one's mouth, can have such a large effect on our daily actions. This idea, of course, holds true not only in the case of one's mouth, but also in many other facets. ■

ACKNOWLEDGEMENTS

I would like to extend my sincere gratitude to my wonderful parents for their constant support, encouragement, and guidance. I would like to thank them for giving me the opportunity to further my education at Stern. In addition, I would like to thank Dr. H. Babich for providing the references, reviewing the article, and for his guidance and encouragement.

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THE RIGHT WAY FOR A LEFTY: IMPLICATIONS OF LEFT-HANDEDNESS IN JEWISH LAW

NIKKI LIPMAN

The Torah prescribes laws that dictate each and every aspect of our lives, including, for example, the manner in which we wash our hands and the way we must eat. There are even laws pertaining to the hand which must be used to perform such activities, and these laws differ for someone right-handed and left-handed.

A study by Coren and Porac (1977) found that over the past 5,000 years 93% of the population has been right-handed. The genetic aspect of handedness is not definitive, although a gene for handedness has been identified on chromosome 2. Some believe that the gene demonstrates incomplete dominance. Thus, dominant homozygotes are always right-handed and recessive homozygotes are consistently left-handed while hybrids, or heterozygotes, are ambidextrous and can use either hand [1]. Others are of the opinion that handedness is a multi-factorial trait, perhaps involving environmental factors. In a study about behavioral genetics, Huheey (1977) suggested that most are right-handed because of the evolutionary tendency of mothers to hold their infants on the left side, as the rhythmic beat of the heart is soothing to the baby. As a result, mothers became skillful at manipulating objects with their right hand, and eventually the right-handed trait became selectively favored [1].

For most, left-handedness might mean slight inconveniences such as bumping elbows at the dinner table or struggling to take notes on a righty desk. However, within Orthodox Judaism the implication of being left-handed is far greater. The Talmud describes left-handed people as "*iter yad*", meaning closed or hindered hand. Thus, the phrase *iter yad* indicates that the right hand is hindered from performing tasks with full strength (Rashi, *Shoftim* 3:15). From Biblical sources, the Talmud deduced that the right hand always takes precedence over the left. *Parshat Metzora* states that in order to purify a *metzora*, one with leprosy, the *kohen* puts olive oil and blood from the *korban* on the leper's *right* thumb, *right* ear, and *right* foot (Vayikra 14:14). Additionally, a *korban* sacrificed with one's left hand is invalid. Thus, the Talmud rules that a lefty is forbidden from performing the *avodah* in the *Beit Hamikdash* (Bechoros 45b). Furthermore, the Rambam in *Hilchot HaMikdash* (8:11) states that left-handedness is considered a blemish that makes the *kohen* unfit for the *avodah* [2]. Clearly, handedness is of great importance in regards to the *kohen*'s duties.

Question arises as to whether an ambidextrous *kohen* is considered valid for temple duties [3]. Ambidexterity refers to the equal distribution of fine motor skills between the left and right hands [4]. According to Rabbi Yehuda, ambidexterity means that the right hand is abnormally weak, making it equal in strength to the left hand, and thus, an ambidextrous *kohen* would be unfit to perform the *avodah*. However, other *halachic* authorities believe that one with ambidexterity has an exceptionally strong left hand, equal in strength to the right, and therefore, such a *kohen* would be permitted to perform the *avodah* (Bechoros 45b) [3].

More applicable to the majority of Jews are the numerous *halachot* affected by the precedence given to the right hand. A man's *tefillin* should be tied by the right hand onto the left arm; when dressing, one's right shoe should be placed on the right foot first (Pesachim Daf 57). Rabbi Chaim Kaniefski analyzed such *halachot* and ruled as to the manner in which they should be applied to lefties. For *halachot* that depend on strength, a lefty must do the reverse of a righty. Normally, one takes off his *tefillin* with his weaker, left hand to show that he hesitates to remove them, and begins taking three steps back at the end of *shemoneh esrei* with the left foot, showing hesitation to leave the presence of *HaShem*. However, a left-handed individual must apply these laws to his right hand or foot, respectively, because his right appendages are weaker [2].

More applicable to the majority of Jews are the numerous *halachot* affected by the precedence given to the right hand.

Halachot based upon the positioning of the body, such as leaning to the left at the *Pesach seder*, are the same for right-handed or left-handed people. Additionally, *halachot* involving turning to the right direction are unaffected by handedness (Magen Avraham). One such example is bowing first to the left side and then to the right side when concluding *shemoneh esrei*. The premise behind first bowing to the left is that while praying, one is face-to-face with *HaShem* and, out of respect, one bows to the left, which is *HaShem*'s right side. *HaShem's* right hand is the more powerful, so to speak, and therefore, one bows to the left, regardless of one's own handedness [2].

Interestingly, some of the figures in Tanach were markedly left-handed. Ehud, the son of Gera, used his left-handedness strategically during the assassination of Eglon, the Moabite king (*Shoftim* 3:15-21). Ehud concealed a double-edged sword on his right side so that he could quickly draw the weapon with his stronger, left hand. Since most men were right-handed and carried swords on their left side, the guards took no notice of the weapon and Ehud was successful in murdering Eglon.

Due to a link between left-handedness and stammering [6], there is an opinion that Moshe Rabeinu, who had a speech impediment, may have been a lefty [5]. The *Midrash* (*Shemot Rabbah* 1:26) seems to support this viewpoint. It states that as a child growing up in the palace, Moshe would often play with Pharaoh's crown. Afraid that this may have been an omen that Moshe desired the throne, the Egyptians decided to test the validity of their concern. They placed both a bowl filled with gold and a bowl filled with burning coals in Moshe's reach. In the case that Moshe would reach for the gold it would demonstrate he wanted the throne, but if he chose the coals it would prove he was simply fascinated by the shine, and was of no threat to Pharaoh. Moshe initially reached for the gold, but the angel, Gavriel, guided his hand to the bowl of coals. When the protective angels are mentioned in the bedtime *shema*, it says, "*mismoli Gavriel*" – "Gavriel is at my left," thus indicating that Gavriel controls and protects the left side of the body. Since Gavriel was designated to redirect Moshe's hand, and usually the dominant limb is the one likely to reach for an article [5], it then follows that Moshe was left-handed.

The significance of the right hand extends to even greater levels. When *HaShem* created the world, initially only *din*, judgment, the attribute ascribed to the left hand, was employed. However, upon recognizing that the world could not endure judgment alone, *HaShem* added the attribute of *chesed*, kindness, which is ascribed to the right hand. We need the right hand of *HaShem* so we can repent and be forgiven with His mercy as demonstrated by the verse: "*Yemincha peshuta l'kabel shavim*-Your right hand is extended to accept those who repent" (Pesachim Daf 57). Handedness is not merely an insignificant genetic trait, but rather, it represents the foundations of the world and has implications in practical *halacha* on a daily basis. ■

ACKNOWLEDGMENTS

I would like to thank my parents for being a constant source of support for all of my endeavors. I also want to extend my gratitude to Dr. Babich for his endless dedication and for his guidance in compiling this article.

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THE BODIES EXHIBITION: EDUCATIONAL EXPERIENCE OR MODERN DAY SIDE SHOW?

REBECCA MARMOR

Exhibitions such as "Bodies" in Manhattan and "Body World" in Lost Angeles provide what was once an unthinkable opportunity for the public: the chance to peer into actual human bodies which have been dissected to display organs, bones and other internal structures of interest. For the price of a movie and popcorn, any child or adult can enter an exhibition hall and gaze at a number of bodies (structures from over two hundred bodies are often shown) which have been carefully posed and dissected to reveal brains, hearts, blood vessels, fetuses *in utero*, and various pathological stages of disease. Although the educational power of such exhibits is undeniable, (to understand why, one need only to see the faces of smokers standing close enough to touch a pair of preserved lungs from a person who suffered from emphysema) the ethical issues brought up by the exhibits are both pressing and cause for concern. With the rising popularity and acceptance of such exhibits in secular, as well as in Modern Orthodox Jewish circles, it has become necessary to examine the *halachic* view of them. This paper will explain the science behind the exhibits, and then raise and attempt to answer three *halachic* questions about them.

From the moment of death, the body begins the process of decomposition, which has two primary causes. First, upon death, indigenous bacteria, which inhabited the body during, are suddenly given free reign to consume the flesh Intestinal bacteria begin consuming the intestine, and then spread to other parts of the body. Decomposition can also be attributed to the work of bodily enzymes. On a macroscopic scale, digestive enzymes contained within the intestine eventually spread throughout the body, consuming the body itself. On a microscopic scale, enzymes contained within individual cells are released, and break down the cell and its intercellular connections.

To stop the decomposition process and preserve the bodies for public viewing, in the 1970s, Dr. Gunther von Hagens developed a preservation technique. His technique, known as plastination, halts decomposition by depriving bacteria of a hospitable environment to colonize, proliferate, and metabolize. By replacing the water and fat in the body with a synthetic polymer, von Hagens was able to stop the body from decomposing, while simultaneously preserving its shape and structure [1]. Plastination differs from other methods of preservation because it allows tissues to maintain their natural shape and size. The technique also allows for the display of specimens in the open air; as opposed to the murky bottles of formaldehyde many biology students have encountered.

Now that we have described the technology which enables these exhibitions to occur, we must consider several ethical questions: can a person will her body for the purpose of post mortem exhibition? Should actual bodies of the deceased be displayed for the public? Is it permissible to display bodies of those who have not consented (e.g., prisoners)? And finally, is it ethical to display bodies for a profit? Before we can answer these questions, we must briefly consider how *halacha* has dealt with questions about anatomical study over the millennia.

Halacha, which has rejected all forms of embalming, cremation, and other unnatural means of internment, surely forbids a Jew to specify that his body should be preserved in such a manner.

We begin with the Babylonian Talmud, which relates how Queen Cleopatra had the bodies of her pregnant female slaves cut open for anatomical study to reveal the stages of fetal development (*Niddah*, 30b). In another episode, the Talmud describes how several disciples of Rabbi Yishmael boiled the body of a prostitute who had been sentenced to death, to determine the number of bones in the human body (*Bekhorot*, 45a). In his article on the "Dissection of the Dead in Jewish Law," Rabbi Jakobovitz remarks, in regards to the aforementioned episodes, that "it is noteworthy that no voice of protest was raised against these practices, a fact all the more remarkable since Jewish law in general rigorously upholds the inviolability of the human body in death as in life"[2].

It seems that Jewish law was relatively tolerant towards dissection of human bodies up until the eighteenth century. There is much evidence to suggest that dissections were permitted for legal autopsies. This attitude shifted in 1737, when a Jewish medical student wrote to Rabbi Jacob Emden to ask if in the absence of human cadavers, he would be permitted to participate in the dissection of dogs

on Shabbat [3]. Rabbi Emden's response was twofold. First, he noted that participation on the Sabbath was prohibited and secondly, he explained that it was forbidden to derive benefit from the human body, regardless of whether the deceased was Jewish or not. It should be noted that although the student only posed the question in regard to dissecting dogs, Rabbi Emden used his question as a platform to voice the opinion that dissection of humans is forbidden. This responsum marks the beginning of a decidedly anti-dissection attitude that continued to permeate *halachic* Judaism until present times. The only exception to this ruling which prohibits autopsies, regardless of the religion practiced by the deceased, is when autopsying a body might provide vital clues to assist in the treatment of living patients, and thus could potentially save lives. This ruling is a manifestation of the general attitude in Judaism that "saving life comes before all else." Attitudes concerning both dissection and autopsy have shifted over the millennia and indicate that there is a range of acceptability and permissibility of the practice.

Equipped with both an understanding of the preservation technique and a basic understanding of the opinions of Jewish commentators concerning autopsy, we are now able to delve into the questions raised by such exhibits. We begin by questioning the preservation technique, plastination. *Halacha*, which has rejected all forms of embalming, cremation, and other unnatural means of internment, surely forbids a Jew to specify that his body should be preserved in such a manner. Also, it should be noted that the process of plastination for an entire body can take weeks. This is a clear violation of the *halachic* mandate to bury the dead as quickly as possible [4].

Next, we ask whether or not one can visit exhibitions of plastinated bodies. This question is a manifestation of the same tension which pervaded our investigation of autopsy. It is a tension between the desire to learn, so that we might save lives, and the need to treat the body with utmost respect, bury it quickly, and not gain any benefit from it (as the *halacha* demands). In the case of exhibits, various exit polls of visitors have demonstrated the strong impressions the exhibits have made on the visitors [5]. Displays of lungs blackened with tar, blood vessels crippled with plaque and skin lesions caused by overexposure to the sun, are alarming and can potentially provide inspiration for visitors to take better care of their bodies and possibly take measures which might save their lives.

However, this desire to save the lives of those who visit must be checked by other *halachic* demands. In his responsum from 1737, Rabbi Jacob Emden clearly explained that it is forbidden to derive any benefit from corpses, regardless of their religion [3]. The benefits granted by the exhibitions are of two types: the benefit for those who put on the exhibit and the benefit for those who attend them. Those who stage the exhibit are clearly benefiting economically from displaying the bodies of the deceased. Their profits are based solely on the corpses, because that is what draws people to the exhibits. Besides for the potential health benefits, as explained above, for those who attend the exhibits (which would, perhaps, make the exhibit permissible), there is another, much more disturbing benefit to be gained from them. Just as a family might eagerly anticipate its Sunday afternoon outing to an art gallery or movie, a family might anticipate its trip to see the display of human bodies. People who attend the exhibits surely do so at least partially in hopes of being entertained, and thus derive a forbidden benefit from them.

Perhaps we can best ascertain the purpose of the exhibits from Dr. von Hagens, founder of the company which stages the body Worlds exhibitions and inventor of the Plastination technique. Known in scientific circles as a flamboyant personality, who wears a fedora hat even into the operating theatre, Dr. von Hagens left his post teaching anatomy at a German medical school, to found and run the company. His hat is a nod to the fact that he sees himself as part of the grand tradition of anatomists, such as Dr. Tulp, who was famously depicted by Rembrandt as wearing a hat while teaching an anatomy lesson to a cadre of students during the Renaissance [6]. And finally, Dr. von Hagens has allowed his exhibits to be used for entirely unorthodox purposes. The website of his company proclaims that part of a recent James Bond film takes place in the Miami Body Worlds exhibit [7]. Although Dr. von Hagens began his life as an academic, he has since deviated from that path. He understands the potential for his exhibits to generate income, and is enjoying their surging popularity in mainstream culture. His actions indicate that perhaps the primary purpose of the exhibits is to generate dubious benefits- a financial profit for himself and entertainment for the public. The educational ability of the exhibits apparently has taken a backseat to these other benefits.

If the primary purpose of the exhibits is to entertain visitors and generate profit for a company, it seems rather clear that the *halacha* would forbid a Jew to visit. However, we are left with a final question, which is the hardest to answer. Dr. von Hagens has begun to develop a dental school curriculum using only plastinated specimens, as opposed to fresh cadavers. Some medical schools are also shifting away from dissection of fresh cadavers for gross anatomy [8]. According to *halacha*, is using a plastinated specimen preferable to a fresh cadaver? Because plastination is such a new and unique technology, this question is not easily answered. Until a uniform position is forged by the religious Jewish world, it will be necessary for each medical student to consult with his or her rabbi, should the question arise. ■

ACKNOWLEDGEMENTS

I would like to thank Dr. Brenda Lowey and the entire Stern College community for supporting me as I make my way through the prehealth science curriculum. I would also like to thank Dr. Harvey Babich for having a perpetually open office door (and e-mail box) - which I could always come to when I needed advice, ideas or help with this article. Thanks are also due to Rabbi Yehudah Sarna, manager of religious life at the NYU Bronfman Center, for verifying the *halachic* content of this paper. Finally, but perhaps most importantly, I would like to thank my two sisters and my parents for giving me the opportunity to continue my education at Stern and teaching me that we are only limited if we are unable to dream.

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BEHIND LEAH'S EYES

JENNIFER POLIN

And the eyes of Leah were tender, and Rachel was beautiful of stature, and beautiful of appearance" (Genesis 29:17). Leah was known for her tender eyes, which according to the Medrash, are due to her reluctance to become the wife of Esau. She cried all the time, according to some in prayer, and others in depression, over her supposed fate.

Many commentators discuss the state of Leah's eyes and offer diverging viewpoints. Their differing approaches stem from their translation of the word, "*racot*," tender. Some believe that this word denotes Leah's eyes as her most beautiful feature, whereas others suggest that the term indicated that her eyes were weak due to excessive crying or a type of ailment [3].

Both the Torah Temima and Rashi are of the opinion that Leah's eyes were weak from crying. Rashi cites a Gemara, explaining the reason for her morose state. Leah was in a constant state of mourning due to the fact that she was destined to marry Esau, Jacob's evil brother. While the Targum Jonathan agrees with Rashi, Targum Onkelos and the Rashbam believe that Leah's eyes were beautiful [3].

Assuming that Leah's eyes were tender, there are many potential causes. According to the Torah Temimah, Leah cried so regularly that eventually her eyelashes fell out. Eyelash loss, known as maderosis, has several possible causes, including metabolic disorders such as hypothyroidism and pituitary gland insufficiency. Disorders such as these may have been the trigger for the disease.

Hypothyroidism, a disorder involving an underactive thyroid gland, causes other symptoms aside from eyelash loss including depression, irritability and dry, rough, and pale skin. Both the symptoms and levels of severity are dependent upon the individual's hormonal level [5]. Hypothyroidism may have been the underlying cause of Leah's depression, (of being upset over her destined marriage to Esau). She may have seemed more upset than what was normal due to depression stemming from hypothyroidism. which led to her excessive crying. While Leah did cry regularly, the cause of her eyelash loss may have been hypothyroidism rather than frequent tearing. Once Leah was told that she would be marrying Jacob, and not Esau, her crying stopped, but the text does not indicate that her eyes fully recovered. Perhaps, her depression continued, as she was not the most beloved wife of Jacob.

A pituitary insufficiency, also known as hypopituitaryism has many of the same symptoms of hypothyroidism, however, other symptoms, such as infertility, make this explanation very unlikely [5]. She did have many of the symptoms; however the symptoms for hypopituitaryism overlap a great deal with the symptoms of hypothyroidism. Unlike hypothyroidism, hypopituitarism has other more serious symptoms associated with it, and therefore is a less plausible explanation.

Perhaps, another explanation for Leah's tender eyes is allergic reactions. Working as a shepherdess was heavily exposed to animal related allergies such as animal dander which can cause tearing and red or swollen eyes. She may not have associated her teary eye condition with exposure to sheep, as allergic symptoms can develop much after initial exposure to the allergy [2].

Working as a shepherdess, Leah was heavily exposed to animal related allergies such as animal dander which can cause tearing and red or swollen eyes.

A third possible explanation for Leah's tender eyes is exposure to chemical toxins. Toxins can cause chemical conjunctivitis, commonly known as pink-eye. While chemical conjunctivitis is highly uncomfortable, unlike other varieties of pink-eye it is not contagious, as it is not caused by microbial or viral infection. Toxins such as deleterious volatiles can cause redness, swelling and tearing, and may induce the loss of eyelashes. In the case that Leah was continuously exposed to such toxic volatiles; it is likely that her eyes were damaged [1].

Leah's eyes are described as *racot*, or tender. Commentators present differing reasons of and explanations for *racot*. At one extreme, her eyes were exceedingly beautiful; maybe even her most beautiful physical asset. At the other extreme there are those who believe that her eyes were constantly tearing, thus causing her eyelashes to fall out. Although the actual cause-and-effect relationship may not be clearly defined, such analyses add spice to analyzing the Torah. ■

ACKNOWLEDGEMENTS

I would like to thank my parents for their help and support. I would also like to thank my Saba for his help in finding sources, as well as Dr. Babich for his assistance.

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L'CHAIM – TO A LONG LIFE

CHERYL SCHONBRUN

A topic much discussed in the scientific literature is that of our internal biological clock and what makes it tick. A current suggestion is that our biological clocks are genetically programmed. Researchers, trying to uncover the biological basis for old age and death have been searching for a gene that controls the aging process. One such research team, at the Albert Einstein College of Medicine (AECOM) has introduced mutations into genes of lower species, including nematodes and *Drosophila*, and found that they doing this extended the lifespans of these creatures. Altering the daf-16 gene in the nematode, and introducing a genetic mutation called Methuselah into *Drosophila* was shown to promote longevity of these species [1]. Humans however, are much more complex organisms than nematodes and *Drosophila* and it is not possible to draw conclusions from lower, less complex species and apply the findings to human beings. While these results do provide some evidence that the aging process is genetically controlled, there is much more research that needs to be done.

Employing methods used in an earlier study [2], this research group organized a clinical study of centenarians and their families. Since the centenarians themselves were nearing the end of their lives, the researchers hypothesized that the biological markers that sustained their health might no longer be active or present. Instead, they studied the offspring of the centenarians, relying on their hypothesis that aging is genetically inherited and hoping that the biological markers which sustained the centenarians would be present in their offspring. The researchers concluded that the delayed aging process in the centenarians may be a result of a number of factors, including the CETP gene which controls lipoprotein particle size [1]. Centenarians and their offspring were much healthier than the control group, showing lesser incidences of hypertension, diabetes mellitus, heart attacks, and strokes [1]. Another suggestion was that aging is related to activity of the IGF-1 gene; it was thought that the more active the gene, the longer the lifespan of the individual. However, manipulation of this gene produced contradictory results, increasing the lifespan of lower species, like nematodes and fruit flies, while putting more complex species, like mammals at higher risk for age related diseases [3]. Still, there remains much evidence for the hypothesis that aging is controlled by genes which are inherited from parent to offspring.

Based on the theory that longevity is genetically controlled, we can try to understand the incredible longevity enjoyed by humanity prior to the Flood and the subsequent dramatic reduction in lifespan. Before Adam and Eve ate from the Tree of Knowledge, they were destined to live forever. A possible explanation for their immortality is that they did not possess genetic defects that promote aging and death. Additionally, in the Garden of Eden they were not subject to accidents, diseases, or any of the other non-genetic causes of death. However, after eating from the Tree, they were expelled from the Garden of Eden and were exposed to these non-genetic causes of death, such as accidents or diseases. "On that day that you eat of [the Tree of Knowledge], you will die" (Genesis 2:17) is not to be interpreted literally to mean that upon eating from the Tree they would die, but rather it means that they would become mortal on that day. As a result of eating from the Tree of Knowledge, Adam and Eve became subject to death. After leaving the Garden of Eden, although Adam and Eve were subject to external causes of death, they were still genetically perfect in terms of their "aging genes." They remained biologically young throughout their lives, explaining how they were able to sire children at such old ages [4]. The above explanation offered by Dr. N. Aviezer, Bar Ilan University, incorporates the theory of genetically controlled aging into these early events of humanity.

> Early generations in Genesis were "beloved by God," since they were His initial creations

Besides for the genetic aspect, there are various other explanations for the longevity of ancient humanity. Josephus, a first century Jewish historian who survived and recorded the destruction of the first Temple, explains that the early generations in Genesis were "beloved by God," since they were His initial creations. It is because of this that they lived for an extraordinarily long time. Josephus presented other explanations to explain longevity, including the mediating influence of diet on longevity. This suggestion implies that the longevity experienced by the earlier generations may be something attainable by us as well, as it merely involves a change in diet. A final view of Josephus, which is shared by a *midrash*, is that these generations were granted a long life in order to allow them to discover the laws of astronomy through long term astronomical observations [5].

Ramban explains the long lives of the earlier generations as a reflection of their biological perfection; a characteristic passed down from Adam to all his descendants. This perfection was disturbed by the atmospheric conditions of the Flood during the generation of Noah when only the completely righteous were able to live long lives, as explained in Proverbs (10:27). "Fear of G-d increases man's days, but the years of the wicked shall be shortened." Rambam explains that the longevity of the people mentioned in the Torah was not commonplace; rather it was limited to only those people mentioned in the Torah. Longevity can be attributed either to a miracle or general diet and lifestyle. Ramban attacks the Rambam's view, saying that it does not make sense that only one group of people should benefit from a miracle. In addition, if it was a special diet and lifestyle that allowed these people to live long lives, why would the generations after the flood not choose to adopt the diet and lifestyle of their predecessors, allowing them too to live for an extended period of time [6]?

After the time of Noah, there was an extreme and rapid decrease in the average lifespan. In addition, people stopped being able to bear children at an old age as proven from the fact that Abraham's ability to father a child at the age of 100 was considered a miracle. Thirdly, during the time of Noah, people became weaker and more frail as they aged. These three changes were brought about when God got angry with the people of Noah's generation due to their corrupt ways. God declared that man's days will be reduced to 120 years, at most: "Therefore man's days shall be one hundred and twenty years" (Genesis 6:3). Once again, Aviezer turns to the hypothesis of genetically controlled aging and explains this to mean that God introduced the genes for aging into the human gene pool. A few generations were required for these genes to spread through the entire population which explains the gradual decrease in average lifespan between the generation of Noah and the generation of Abraham [4].

Another explanation of the reduced average lifespan after the Flood is the theory of the proliferation of microfungi, with their biosynthesis of mycotoxins, which contributes to the shortening of the human lifespan. Mycotoxins are secondary metabolites of microfungi and are involved in causing pathologies which could contribute to the shortening of the human lifespan. While microfungi existed since prehistoric times, the production of mycotoxins was limited by environmental conditions. Fungal growth is favored by conditions of high humidity and moisture and the type of mycotoxins produced differs and is based on the ambient temperature. When God brought about the great Flood, it rained for 40 days and 40 nights and the water did not subside for 150 days. Noah and his family survived by living in an ark for the duration of the flood. Upon disembarkation, they had to start anew. They made bricks to build houses and used slime for mortar, which was burned thoroughly (Genesis 11:3). This slime was undoubtedly full of microfungi and mycotoxins. Mycotoxins can adversely affect human behavior. When comparing the lifespan of individuals born before the Flood and those born after the Flood, a progressive decrease in longevity is evident. Shem, born before the Flood, lived for 600 years, while his son Arphaxad was born two years after the Flood and only lived for 438 years. This exemplifies how harmful agents, such as mycotoxins, may have impacted parents during the prenatal period, thus caused defects in the fetuses [7].

We are living in an era in which scientific discoveries are being made on a daily basis and we are fast approaching a cure for aging. However, we now face ethical and theological issues regarding the possible elimination of death. There are tremendous moral consequences associated with such a step. Man was originally created as an immortal creature, but when Adam violated God's command and ate from the Tree of Knowledge, a biological clock was set for all of mankind [5]. Now that we are moving towards an attempt to override God's biological clock, we are faced with the question: what gives us the right to take this leap? If there were reasons for the mechanisms of aging and death to be put in place, how can man eliminate them?

In the time of the Messianic Age, the human race will again enjoy the longevity once experienced by the earlier generations, as stated in Isaiah (65:20): "From then on, there will no more be one tender in years or aged, who will not fill his days, for as an adolescent one shall die at a hundred years old, and a sinner a hundred years old shall be [considered] cursed." This verse may indicate a slowing of the biological clock. At a hundred years old, one will be considered an adolescent, which indicates that our entire lifespan will be increased by a factor of 7.7 (taking adolescence today to be around age 13). Instead of 120 years being the maximum lifetime, one may live for as many as 923 years, similar to the average lifespan of the generations after Adam. Maimonides stressed that the Messianic time will not be a time of miracles, and thus nothing that violates the laws of nature will occur. He explained that the Messiah will be an inspirational leader who will bring about the realization of human potential, which will bring about peace. This suggests that humans will live long lives due to their carefree existence, coupled with scientific and technological advances (though this is not mentioned by Maimonides). Longevity will bring about a change in the attitude of man towards his fellow human beings. When a person sees his own mortality as imminent, he is more likely to be aggressive towards his fellows. Conversely, a man who envisions many more fruitful years ahead of him will be less likely to risk his life in war. It is more likely that one will recognize his fullest potential and be less likely to destroy it all through aggressiveness. Death, however, does have some positive value. An immortal man could easily become immersed in a material world, forgetting life's spiritual value. It is for this reason that immortality will have to wait for the Messianic Age, a time when spirituality will be so embedded in our very essence that we will not need death to remind us of its importance [5]. ■

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my wonderful parents who support me always, and to Dr. Babich who continuously provides me with guidance and encouragement.

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HOW WOULD *YOU* DEFINE *TZARAAS*?

RACHEL SECUNDA

For centuries, people have assumed that leprosy is the skin disease known, in the Torah, as *tzaraas*. However, a comparison between the symptoms of modern-day leprosy and biblical tzaraas clearly demonstrate that these two diseases are distinct conditions. In Chapter 13 of Leviticus, the Torah describes the characteristics of tzaraas. Tzaraas is a condition that fully develops on the skin within a week. The symptoms include swelling (*se'et*), scabbing (*sappahat*), or depigmentation of the skin (*baheret*). Additionally, at least two hairs must turn white, and the Cohen must also note a depression in the center of the affected area. If someone appears before the Cohen with some, but not all, of the symptoms, he is separated from the community and further observed after one week. If, after the secondary inspection, the area of depigmentation has grown, the person is identified as a *metzora*, but if the size remains the same, the person is no longer suspected of having *tzaraas* [1].

The symptoms of leprosy, however, are distinctly different from tzaraas. In 1869, Gerhard Hansen identified leprosy as *mycobacterium leprae*, and gave it its modern name of "Hansen's bacilla." He found that *mycobacterium leprae* does not grow *in vitro* on any non-living surface. The *Torah*, on the other hand, discusses what a person should do if his house or clothing is afflicted with *tzaraas* [3]. Hansen's bacillus is associated with an incubation period of eight years, and causes loss of hair without changing the color of the remaining hair [2]. Since their only common characteristic is their appearance on the skin, it seems strange the two skin afflictions would be connected.

How did *tzaraas* become synonymous with leprosy? The usage of *tzaraas* in the *Torah* is vague since it does not refer to a specific type of skin disease [3]. Although the Greeks were aware of Hansen's disease, they referred to it as *elephantiasis graecorum*. Yet, at the time of the Septuagent (250BCE), the Greek word chosen to translate *tzaraas* was *lepra*. Though the term *lepra* is related to the modern day word leprosy, leprosy was not identified until 600 BCE in India and did not appear in the Middle East until 325 BCE. It is therefore improbable that the *Torah* was referring to leprosy, since the disease wasn't identified by that epoch [4]. It is not surprising then that Hansen's disease became confused with leprosy when the Arabic translation of *elephantiasis graecorum* was mistakenly confused with *lepra graecorum* [4, 5]. When Hippocrates discussed *lepra*, he specifically notes that those suffering from leprosy have gray hairs and not white [5]. Because of the association with the Biblical passages, people afflicted with leprosy, or any similar skin disease were often shunned and even persecuted. Hence the complex origins of the word are indicative of the ambiguous nature of *tzaraas*.

The Rabbis understand *tzaraas* to differ from leprosy, as well. The Mishna's focus is the colors of the skin and the elucidation of the Leviticus text (*Negaim* 1:2). They do not identify *tzaraas* with a specific skin disease. The Talmud views *tzaraas* as a non-contagious condition. For example, it is written that if someone first noticed a skin eruption that seemed like *tzaraas* during a Festival, they did not have to have it checked until the Festival had ended. Yet, at that time, the common belief was that leprosy was extremely contagious, and the Rabbis spoke at length about the importance of separating from lepers immediately after the signs appeared [2]. Additionally, the Talmud refers to a leper as a *ba'ale ra'atan* which is further support that the two afflictions were not related [6].

However, a comparison between the symptoms of modern-day leprosy and biblical tzaraas clearly demonstrate that these two diseases are distinct conditions.

If *tzaraas* is not Hansen's disease, what is the modern-day equivilent *tzaraas*? There are many differing opinions. E.V Hulse studied several skin diseases including *psoriasis*, *seborrheic dermatitis*, *favus*, and *alopecia areata*. None of the diseases he listed cause hair to turn white except for *alopecia areata*. Even in the case of *alopecia*, the hair takes many weeks to grow and previous hair doesn't lose its pigment. Lloyd Davies suggested neurodermatitis or scarlet fever, but both do not cause any loss of hair color. Katzenelensohn presented the idea that *tzaraas* was some kind of fungus or mold. One such possible fungus is *trichophytosis* which can affect the hair and also a house or clothing. The benefit of labeling *tzaraas* as *trichophytosis* is that it can affect not only the person but also the belongings which is the same description of *tzaraas* in Leviticus

[2]. David Kaplan believes that perhaps there is no disease that matches up with *tzaraas* and that all the symptoms of *tzaraas* were necessary because they would keep innocent people from being falsely punished. Kaplan believes that the *Torah* was trying to prevent an unnecessarily negative attitude towards the members of the community with common skin diseases while at the same time making sure that those people who had sinned were properly dealt with [4].

Evidently, it is difficult to pinpoint a specific medical skin affliction as the modern day definition of *tzaraas*. Nevertheless, it is clear that leprosy is not a possibility, and only became associated with *tzaraas* because of mistranslations centuries ago. ■

ACKNOWLEDGEMENTS

I would like to thank my family and friends for all their support. I would especially like to thank my brother-in-law, Rabbi Elli Fischer, for editing my paper for its Torah content. Thank you also to Dr. Babich for helping me select my topic and for editing my paper for its science content.

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PSYCHONEUROIMMUNOLOGY: BODY AND SOUL

NILI SELESKI

Psychoneuroimmunology (PNI) is a large word for a seemingly simple concept: the interaction between physical body and mental mind. However, the scientific community did not accept the idea that the physiological and the psychological were connected until relatively recently until the 1970s, when George Engel described a concept known as the "biopsychosocial model." Biology could not explain all of the human physiological states and responses, so Engel suggested that there must be an interaction between psychology, biology, and social factors. The study of psychoneuroimmunology has begun to explore Engel's "biopsychosocial model." [1] New research linking the body and mind supports Engel's theory and leads to a discussion of the biological effects of psychological and social factors. Researchers such as Yakir Kaufman, M.D. have also begun to broaden the scope of mental factors that influence the immune system to include religion and spirituality.

Perhaps the greatest example of the mind's power over the body's functions is the "placebo effect." Before a drug is approved for the market, the effects of its sister placebo pill must be tested. A placebo drug has no pharmaceutical impact on the patients, but, because the patient believes it to be the actual drug, the placebo can cause similar desired effects like those of the real medication. In the case of the "placebo effect", it is the patient's mind that is forcing the biological changes in their body while the drug is doing nothing at all. [2] Psychoneuroimmunology is the study of this phenomenon.

PNI is the study of the interplay between the immune system, endocrine system, and central nervous system. [1] New technologies, such as neuroimaging, functional magnetic resonance (FMRI), positron emission tomography (PET), and single photon emission computerized tomography (SPECT) allow doctors and researchers to locate different areas of the brain and monitor central nervous system activity more closely. Additionally, advances in molecular biology have opened the door to the study of PNI, giving researchers the opportunity to observe the changing levels of hormones and proteins during different psychological experiences.

These scientific innovations have led to several studies which examine the effects of different psychological states on the body and the immune system. In particular, researchers focus on the mental condition of stress. Stress triggers two chemical responses in the body by initiating the "fight or flight" response. First, the endocrine system releases hormones such as cortisol, ACTH, and CRH, which enter into the blood stream and inhibit the immune system. [2] Stress also induces the sympathetic nervous system to produce adrenaline. Adrenaline increases heart rate, muscle tension, lung ventilation, and changes the rates of the digestive system. [3] Prolongation of stress maintains this heightened biological state which causes more wear and tear on the body and inhibits the body's ability to fight infection.

Different studies have corroborated the link between stress, decreased immunity, and lengthened healing time. Marucha et al. (1998) tested the healing times of students during stressful exam periods and during vacation. The wounds administered before the exams

> The sages make a clear connection between the body and soul.

healed forty percent slower than the wounds administered during the vacation period. [1] In another study, by J.K. Kiecolt-Glaser, levels of immunoglobulin Type A (IgA) decreased as exams approached and increased during less stressful periods of the year. IgA helps prevent infections in the respiratory tract, colds, and the flu. Therefore, during stressful periods when the students had lower levels of IgA, they were more susceptible to the mentioned illnesses. [3] Additionally, studies have found that the levels of proinflammatory cytokines are reduced in stressed persons. The cytokines are crucial in tissue repair because they ward off infection and attract fibroblasts and macrophages to the broken tissue. The decreased levels of the cytokines caused by stress therefore leads to more infections and slower healing time. [1]

Data gathered from studies and research, such as the above, has pointed to the harmful outcomes of stress. Since stress causes the body to react with the "fight or flight" response and to decrease immunity, there must be a cause of the opposite relaxation response. Yakir Kaufman, claims that prayer produces this converse physiological response. It triggers the parasympathetic nervous system to decrease the heart rate, blood pressure, and muscle tension, and to change the pace of the digestive system. [3]

Furthermore, the consequences of stress can be prevented not only by inducing the opposite physiological responses, but also by

simply relieving a person of the stress itself. Steve Lipman, in the article "Good for Body and Soul," describes how religion can alleviate stress. He writes, "For many men and women, a daily prayer service becomes a de facto support group, combining features of group dynamics and self-help groups." [4] Lipman is highlighting the fact that spiritual religious service can help reduce stress by acting as a support group would, thus leading to better health. Scientific data has begun to support Lipman's article. A Duke University study found that people who attend religious services at least once a week show lower levels of interleukin-6 in their blood. Interleukin-6 is a protein in the immune system linked to many age related diseases. [4]

This connection between body and psychology only recently supported by scientific data is not a new concept. The Talmudists equate the 248 limbs of the human body with the 248 positive commandments of the *Torah*. By doing so, the sages are making a clear connection between the body and soul. The connection between this Talmudic idea and PNI revolves around the definition of health as given by the World Health Organization: "Health is a complete state of physical, social, and mental well-being and not the mere absence of disease or infirmity." The health of a person includes one's spiritual well-being. The Zohar (I, 170b) mirrors the physical body with spiritual elements, thus alluding to this idea. Rabbi Dov Ber, the *Maggid* of Mazritch, explains what the Zohar is trying to convey as a " small hole in the body is a big hole in the soul". [2] Researchers are beginning to agree. ■

ACKNOWLEDGEMENTS

I would like to thank Dr. Babich for his help in gathering the information for this article, and my roommate Abby for listening to it so many times.

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SIAMESE TWINS: TOGETHER FOREVER?

DEVORAH THALER

The term, Siamese twins, was coined as a reference to Eng and Chang Bunker, who achieved international fame following their birth in what was then Siam, now Thailand, in 1811. Siamese twins, also known as conjoined twins, occur when the monozygote of each identical twin fails to completely separate due to the incomplete division of the fertilized ovum. Conjoined twins occur approximately one in 200,000 births, with 40-60% delivered stillborn and with 35% surviving just one day. The overall survival rate for conjoined twins is between 5 and 25%. Conjoined twins are three times more likely to be female than male.

There are several different types of conjoined twins:

1. Thoracopagus: Bodies fused at the thorax. The heart is always involved in these cases; when the heart is shared, prospects for a long life, either with or without separation surgery, are poor (35-40% of cases).
2. Omphalopagus: Joined at the lower chest. The heart is not involved in these cases but the twins often share a liver, digestive system, diaphragm and other organs (34% of cases).
3. Pygopagus (iliopagus): Joined, usually back to back, to the buttocks (19% of conjoined twins).
4. Cephalopagus: Heads fused, bodies separated. These twins generally cannot survive due to severe cerebral malformations.
5. Craniopagus: Skulls fused, but bodies separate (2%).
6. Dicephalus: Two heads, one body with two legs and two, three, or four arms.
7. Ischiopagus: Anterior union of the lower half of the body, either with spines conjoined at a 180° angle (6% of cases) or with the spines separate but both the pelvises forming a single big ring which includes two sacrums and two pubic symphyses.
8. Ischio-omphalopagus: The most well known type of conjoined twins. The twins are conjoined with spines in a Y-shape. They have four arms and usually two or three legs. These cases can be challenging because the twins often share reproductive and excretory systems.
9. Parapagus: Lateral union of the lower half extending variable distances upward, with the heart sometimes involved (5% of cases).
10. Diprosopus: One head, with two faces side by side [1].

Until very recently, thoracopagus twins with conjoined hearts did not survive for more than nine months without surgery to separate them. Early attempts at separation of thoracopagus twins with conjoined hearts met with little or no success. The first case to receive widespread attention was a procedure performed at Children's Hospital of Philadelphia in October 1977 by Dr. Everett Koop, who later became Surgeon General of the United States.

The drama began early in September 1977, when Siamese twin girls were born to an Orthodox Jewish family of Torah educators in Lakewood, New Jersey. The twins were airlifted to Children's Hospital of Philadelphia on September 15th. Immediately after the initial evaluation it was obvious to the physicians that both twins would die unless separated. The only way one child would survive was if the other was sacrificed during surgery.

> Although there was no ruling of a *beit din* that Baby A was guilty of any sin and therefore subject to the death penalty, Hashem Himself issued such a ruling. There was a Heavenly edict that no one could save this child.

The medical case involved Baby A and Baby B who were fused from the shoulder down to the pelvic region. The twins shared only one six-chambered heart. Baby B had an essentially normal, four-chambered heart that was fused to the stunted two-chambered heart of her sister, Baby A. It was impossible to give the two-chambered heart to Baby A so that she could survive for as long as a two-chambered heart could suffice her physiological needs. The only solution was to give the entire six-chambered heart to Baby B and, therefore, to sacrifice Baby A.

This was a major ethical issue with ramification for the abortion debate and neonatal salvage. Dr. Koop, a deeply religious man and

fully aware of the ethical import of this case, referred the case to the courts so as not to have any accusation of premeditated murder leveled against him. In addition, all the nurses and doctors at Children's Hospital consulted their religious authorities. The twins' parents consulted Rabbi Moshe Feinstein, Rosh Yeshiva of Tifereth Jerusalem in New York. Rav Moshe sent his son-in-law, Rabbi Moshe Tendler, Ph.D., to meet with Dr. Koop and his staff to determine the facts. The first *halachic* concern established was that they were dealing with two separate human beings, each with their own brain and nervous system. Dr. Koop recommended that the twins be separated as soon as possible because there were signs the heart was failing and could not maintain the load of supplying blood to both infants. It was emphasized that even with surgery, the chance was slim that one baby could be saved. Siamese twins, up to this point, had never been separated from a ventral connection, especially with a shared heart and liver.

On October 3rd, the ICU nurse assigned to the twins noticed changes in the heart rate, the respiration rate, and the electrocardiographic tracings. This was reported to Rav Moshe who then posed the key question: Was Dr. Koop certain that the six-chambered could only be given to Baby B and not Baby A? Dr. Koop responded that there was no doubt that only Baby B could be helped by the surgery, because, in addition to the shared heart and liver, Baby A had a circulatory defect that would not permit her to survive for any length of time, even with the six-chambered heart.

While the team put together for the surgery was awaiting Rav Moshe's decision, they began to get impatient. Dr. Koop quieted the group with the following statement:

> The ethics and morals involved in this decision are too complex for me. I believe they are too complex for you as well. Therefore I have referred it to an old rabbi on the Lower East Side of New York. He is a great scholar, a saintly individual. He knows how to answer such questions. When he tells me, I too will know [2].

After much discussion, on October 6th, Rav Moshe instructed Rabbi Tendler to call Dr. Koop and instruct him to go ahead with the surgery.

One of the fundamental rules of *halacha* in *Mishna* (*Ohaloth* 7:6), states that one life may not be sacrificed for another, with the exception of a fetus to save the life of the mother during delivery. This is only permissible if the head of the fetus has not been delivered. The *Talmud* in *Sanhedrin* (72b) poses the question, "Why shouldn't the infant be sacrificed even if the head has appeared, since the infant is endangering the life of the mother? Isn't the infant a *rodef*, a pursuer?" Rambam states (*Hilchot Rotzeach* 1:9) that Jewish law regards it as not only permissible, but as mandatory, to eliminate a *rodef* when it is necessary to do so in order to preserve the life of the victim. The Talmud responds, "No, Heaven is the pursuer." It is an act of G-d and we cannot assume that the infant is the attacker, and therefore cannot be killed. If the head of the fetus has been delivered, then the fetus now is a separate entity and is granted the full rights and privileges as an adult. The most important of these privileges is the right to life. Rambam agrees with this reasoning in his *Hilchot Rotzeach* (1:9). Rambam states that "Once the head has appeared we longer intervene because we cannot destroy one life for the sake of another. For this is the natural law." Rav Moshe compared the twins to the classic case of the conflict for survival between the mother and fetus. However, because Baby A had no independent ability to survive, in *halachic* terminology she would be classified as a *rodef*, pursuing her sister and threatening her life. Further testing revealed that Baby A was receiving blood from two apertures leaking from the four chambered heart and if not for that contribution of blood, Baby A would have died in utero [2].

A second approach was suggested based on the *Talmud Yerushalmi* (*Terumot* 8:4) which discusses the incident of Sheva ben Bichri, who led a rebellion against King David. Yoav's army chased after him and laid siege to the town in which Sheva was hiding. Yoav demanded that the town turn over Sheva ben Bichri and only then would he cease the siege. The Gemara rules that it is forbidden to hand over one Jewish life, even if all must forfeit their lives. However, if one individual is singled out, as in the case of Sheva ben Bichri, the *halacha* states that he should be handed over and everyone else be saved. Resh Lakish argues that this ruling only applies when the person is guilty of a death penalty, like Sheva ben Bichri. While Rav Yochanan states that this is not a prerequisite. The Rambam (*Hilchot Yesodei HaTorah* 5:5) agrees with Reish Lakish that if the person that the pursuers demand is liable to the death penalty, as was Sheva ben Bichri, it is permitted to turn him over in order to save the rest.

Rav Moshe concludes that it is clear that in our case, where both twins would have died, it was permissible to sacrifice one to save the other, because Baby A could not survive no matter what surgical plan was followed. Although there was no ruling of a *beit din* that Baby A was guilty of any sin and therefore subject to the death penalty, Hashem Himself issued such a ruling. There was a Heavenly edict that no one could save this child. Therefore, Baby A was classified as if she were Sheva ben Bichri, for whom there was no hope of survival. Thus, because of the congenital heart defects in Baby A, she had been designated for death and it was therefore permissible to hasten that death so that her sister might survive.

On October 11th, at 10:40 AM, Dr. Koop tied off the carotid artery feeding blood to the brain of Baby A. Death was instantaneous. Quickly, the major blood vessels of Baby A's partial heart were blocked. Four hours later the surgery was completed. Baby B was back in the ICU and the body of her sister was brought home for burial [3]. Sadly enough, Baby B died 47 days later from causes unrelated to the surgery, as a result of contracting hepatitis B from a blood transfusion [4]. It has been said that Dr. Koop was rewarded for awaiting Rav Moshe's decision by later becoming the U.S. Surgeon General. ■

ACKNOWLEDGEMENTS

I owe a tremendous debt of gratitude to my parents for their help in "smoothing out all the rough edges." Thank you to my friends for their encouragement and support. An additional thank you to Dr. Babich for being available at all times for all sorts of questions, for his help and guidance in writing this article.

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WINE, APPLES, AND DATES

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For spiritual Jews, the periods prior to, during, and after *Rosh HaShanah* are intense, with individuals asking for forgiveness and praying for a happy and healthy New Year. For gastronomic Jews, the highlight of *Rosh HaShanah* is its fine foods and superb meals. For Jews combining both traits, the traditional holiday foods, served in plentiful portions, are symbolic omens for the coming year (Horayos 12b) and serve to strengthen the spiritual mindset of the observant Jew. This article discusses some Talmudic thoughts, coupled with medical information, on wine, apples, and honey – food items consumed on *Rosh HaShanah*

Wine

All meals of the major Jewish holidays, including *Rosh HaShanah*, commence with *kiddush* (the sanctification of the holiday with wine), *netilot yadayim* (the ritual washing of the hands), and *hamotzi* (the blessing of the bread). Wine, the first food item consumed at holiday meals, "gladdens the heart" (Tehillim 104:15).

Wine has medicinal properties, as noted in Bava Basra (58b), "At the head of all cures am I, wine. In a place where there is no wine, there, medicinal herbs will be required" to cure diseases. Yesterday's medicinal herbs are today's pharmaceuticals; wine has pharmacological properties mimicking therapeutic drugs. For example, resveratrol, a polyphenolic antioxidant in red wine, mimics aspirin; both inhibit aggregation of blood platelets and play a role in preventing thromboses and myocardial infarctions [1].

Rav Huna stated, "If one drinks wine regularly, even if his heart is closed as that of a virgin, wine will open it" (Bava Basra 12b). Furthermore, as stated in Zechariah (9:17), "An old wine will open the mouths of the maidens in song." Rav Huna's statement implies that the heart, the symbol of emotions and feelings, is opened by wine, causing an inhibited person to express inner feelings. However, perhaps Rav Huna's statement can be taken literally: the regular consumption of wine, albeit in moderation, causes the heart and its accompanying blood vessels to remain open. There is much information in the literature to suggest that consumption of red wine leads to a healthy heart. Resveratrol inhibits production of endothelin-1, which, when overproduced may cause thickening of the blood vessels and atherosclerosis. In addition, the alcohol (ethanol) component of red wine promotes the elevation of high-density lipoprotein cholesterol, a protective factor against atherosclerotic cardiovascular disease [2].

The ocular effects of wine are noted in Pesachim (92a): "Old wine ... illuminates the eyes." Similarly, in Tanna De'Bei Eliahu Zuta (#13) it is stated, "Wine gives pleasure to old people, makes their hearts happy, refreshes their souls, and illuminates their eyes." Interestingly, medical studies complement Judaic texts. Scientific sources have indicated the health benefits of moderate red wine consumption on retinal disease in the elderly. Age-related macular degeneration (AMD) is the leading cause of blindness in adults 65 years of age and older. Obisesan *et al.* [3] noted a negative correlation between moderate consumption of wine and the development of AMD among older people. AMD and other retinal diseases, such as proliferative vitreoretinopathy, are associated with oxidative stress. It was suggested that resveratrol, the key antioxidant polyphenol in red wine, may be responsible, in part, for the health benefits of moderate wine consumption on retinal disease [4].

> Medical benefits associated with the consumption of specific food items were noted centuries ago by our Talmudic sages

Wine has positive health effects on the brain and on the thinking process, as noted in Eruvin (65a): "Anyone who is settled with a clear mind, after drinking wine, contains the attributes of 70 judges" (i.e., of the *Sanhedrin*). Recent reports associate the daily consumption of a few glasses of red wine (3 to 4 per day, i.e., 250 to 500 ml) with a diminished risk of Alzheimer's disease and of cognitive deficits [5].

In Berachos (51b) it states that old wine is beneficial for the intestines. The bacterium, *Helicobacter pylori*, is associated with gastric ulcers. Red wine exerts antimicrobial effects to *H. pylori* [6] and the daily intake of wine may prevent the development of gastric cancer [7]. Additionally, red wine contains >200 different polyphenols, many of which, due to their antioxidative and anti-inflammatory properties, inhibit the initiation of cancer. For example, Briviba *et al.* [8] noted that red wine polyphenols inhibit

the *in vitro* proliferation of human colon carcinoma cells.

Moderate wine consumption has also been associated with healthy bone development. Abba Shaul said, "I was one who buried the dead and I would look at the bones of the deceased. Through my observations I learned the following. One who would regularly drink undiluted wine, his bones were burned, one who regularly drank overly diluted wine, his bones were dry, and one who would drink properly diluted wine, his bones were well lubricated" (Niddah 24b). And moreover, "Old wine ... makes the posture erect" (Pesachim 92a). Felson *et al.* [9] observed that women who drank at least 7 oz/week of alcohol had higher bone densities at most sites than women with the smallest intake of alcohol (<1 oz/week). Thus, it was concluded that an alcohol intake of at least 7 oz/week was associated with high bone density in postmenopausal women, an effect possibly related to the augmentation of endogenous estrogen levels by alcohol. Similarly, men who were heavy drinkers (≥ 14 oz/week) also had higher bone densities than light drinkers. Ganry *et al.* [10] noted that moderate drinking (e.g., 1-3 glasses of wine/day) was associated with an increase in trochanteric bone mineral density in elderly ambulatory women. In an investigation of whether the intake of different alcoholic beverages was associated with the outcome 2_ years after first-time lumbar disc surgery, Rasmussen [11] observed that the intake of wine correlated with a good prognosis.

The data cited above reflect the positive health effects of wine consumption on specific body functions. The Talmud also presents a blanket statement regarding the health effects of wine, "Old wine is good for one's entire body" (Pesachim 92a). Consumption of red wine has been associated with protection against lung cancer; a 57% lower risk of developing lung cancer was noted in consumers of wine, as compared to those who did not drink red wine at all. Another study noted that men who consumed four or more glasses of red wine/week reduced their risk of prostate cancer by 50% (Peregrin, 2005). In yet another study, the link between wine drinking and total mortality risk (all causes combined) was evaluated. The results of various population studies showed that intake of wine seemed to have a beneficial effect on all causes of mortality. Several studies noted that in subjects consuming wine in moderation, the risk of mortality from all causes was 20-30% lower than in abstainers [12]. As Rav Chanin bar Pappa once said, "Anyone in whose home wine is not poured like water, is not in the category of being blessed" (Eruvin 65a).

Chazal recognized the problems associated with the over-consumption of wine (see Kesuvos 65a; Megillah 12b; Niddah 16b; Eruvin 64a; Yavikra Rabbah 12:1; Bamidbar Rabbah 10:1), as did the National Institute on Alcohol Abuse and Alcoholism. Although separated by many generations, both suggested that wine consumption in moderation can be beneficial, perhaps one or two drinks/day. Both groups also recognized that alcohol affects people in different ways [2]. For example, Rabbi Yehuda bar Ilai suffered from headaches for 7 weeks after consuming the 4 cups of wine on *Pesach* night (Niddah 49b). Many of the positive health effects of red wine cannot be duplicated with the consumption of beers or liquors. Thus, although the alcohol component in the red wine may contribute to the overall health benefits, other constituents in red wine (notably, the polyphenols) play an active role in promoting health

Apples

"Dip the apple in the honey" is a favorite holiday song of children. It is customary that meals on *Rosh HaShanah* include food items symbolic of a healthy, prosperous, and productive new year. Although it may seem obvious that these meals include honey, as it symbolizes sweetness (see Orach Chayim, Hilchos Rosh HaShanah), why specfically an apple? Apples are not even one of the seven agricultural species for which *Eretz Israel* was blessed. A hint of the special status of the apple is noted in a *tosefos* in Berachos (37a). The Talmud discusses the general blessing of *borei nefashos* and the *tosefos* explain the expressions in this blessing as follows. The phrase, "their deficiencies," refers to items that supply an individual's fundamental needs, such as bread and water, and the phrase, "all that He created," refers to the extras, such as apples and similar foods, non- essentials for life but which *HaShem* created for people to enjoy. Of all the possible food choices that could have been mentioned, the *tosefos* focused on the apple!

A connection between apples and *Rosh HaShanah* is implicated when *Ya'akov* came to *Yitzchak* to receive his blessing. *Ya'akov* entered and *Yitzchak* sensed the aroma of *Gan Eden* emanating from *Ya'akov*'s garments and stated, "My son's fragrance is like the fragrance of the field which is blessed by *HaShem*" (Bereshis 27:27). Rav Yehudah, the son of Rav Shmuel bar Shilas, said in the name of Rav that the odor was of a field of apples (Ta'anis 29b). Rashi explains that the fragrance refers to a "field of apples," which in kabbalistic terminology alludes to *Gan Eden*. The garment worn by *Ya'akov* originally belonged to *Adom HaRishon*, thus explaining the connection between the garment's aroma and *Gan Eden*. Rabbi Gold [13] cited a view in the Zohar Chadash that the day on which *Ya'akov* received the blessing from *Yitzchok* was *Rosh HaShanah*.

Apparently, the main and possibly the only citations explicitly mentioning apples in *Ta'nach* are in Shir HaShirim (2:3 and 2:5).

> "Like the fruitful, fragrant apple tree among the barren trees of the forest, so is my Beloved among the "sons" (translated as, false gods). In His shade I delighted and there I sat, and the fruit of His Torah was sweet to my palate" (2:3).

In Perek Shirah (3:27), this *pasuk* (2:3) is designated to the apple and its concluding phrase, "sweet to my palate," is a source for dipping the apple into honey on *Rosh HaShanah*.

The other *pasuk* in Shir HaShirm which mentions apples is: "Sustain me in exile with dainty cakes. Spread fragrant apples about me to comfort my depression – for, bereft of Your Presence" (2:5).

Rabbi Zlotowitz [14] cited Tractate Soferim (16:4) to explain that this *pasuk* allegorically refers to Israel's love-sickness for *HaShem*, while awaiting for their redemption. The "dainty cakes" are a reference to Israel's longing for well-founded *halachos* and "apples" as a reference to Israel's desire for *agaddos*.

Apples have medicinal properties. Rabbi Gold [13] noted a *tosefta* (Bava Metzia 7:2) that grapes and apples were brought to the sick; Y. Levinson [15], a nutritionist, quoted a Zohar (*Acharei Mos*), "Just as the apple heals all, so the Holy One, blessed be He, heals all." Today, apples, fruits, and vegetables in general, are considered to have many health-promoting effects. Cancer and cardiovascular disease, the two leading causes of death in the United States, have been linked to lifestyle choices, in particular, to diet. The majority of epidemiological studies linking diet and cancer have noted a reduced cancer risk in those who consume a diet rich in fruits and vegetables. A diet rich in fruits and vegetables also affords protection against coronary diseases [16].

Much of the protective effects of fruits and vegetables are attributed to their phytochemicals, non-nutrient plant chemicals, such as carotenoids, flavonoids, isoflavonoids, and polyphenolic acids. Phytochemicals serve as antioxidants, to protect against oxidative stress resulting from the metabolism of the foods we ingest. When compared to many of the commonly consumed fruits in the American diet, apples, after cranberries, have the second highest level of antioxidant activity. Furthermore, apples have the highest portion of "free" phenolics, those that are readily available for absorption into the blood stream. It is important to note that the health benefits associated with apple consumption apply to the consumption of the entire fruit, i.e., the peel and the flesh. Various varieties of apples afford different degrees of health effects, with Fuji and Red Delicious apples having the highest antioxidant activity [16].

Health effects specifically linked to consumption of apples include a reduced risk of lung cancer, asthma and chronic obstructive pulmonary disease, cardiovascular disease and, in particular, death from coronary heart disease and type II diabetes [16]. Recently, Liu *et al.* [17] showed that whole apple extracts prevented mammary cancer in a laboratory rat model, in a dose-dependent manner, and at doses comparable to human consumption of one, three, and six apples/day.

In addition to its phytochemicals, apples contain nutritional fiber, both insoluble and soluble fibers. Pectin, a major soluble fiber in apples, has the potential to lower the blood level of cholesterol. Apple peels, which contain insoluble (or, non-digestible) fiber, are noted for their anti-constipation and anticancer effects. A medium apple with its skin contains about 3.5 grams of fiber, an amount higher than that in one medium banana or orange, one peach, large pear (with its skin), and three prunes (Levinson, 1995). The phrase, "an apple a day keeps the doctor away," may, in fact, have some validity.

Dates

Dates, the fruit of the date palm tree (of *lulav* fame), are one of the seven agricultural species for which *Eretz Yisroel* was blessed. In relating the goodness of *Eretz Yisroel*, the Torah (Devorim 8:8) uses the phrase, "a land flowing with milk and honey." Here "honey" refers to date, not bee, honey (Sifre; Yonathan ben Uziel). The Bnei Yisaschar (cited by Gold) notes that the Hebrew term for honey, *d'vash*, has the same *gematria* (numerical equivalent) as the Hebrew phrase, *Av HaRachamin* (Father of mercy), thus evoking Divine mercy and compassion. Moreover, dates (*tamar* in Hebrew) are one of the symbolic food items eaten at the *Rosh HaShanah* meal and their consumption alludes to the destruction (*yitamu*) of our enemies (Tur Orach Chaim 583).

Health benefits related to the consumption of dates as noted by our sages (Kesuvos 10b; Gittin 70a) include the following: dates warm the body, satiate the appetite, loosen the bowels, provide energy, and, although sweet, do not lead to an addiction for rich foods. When eaten after the morning breakfast and the evening dinner (i.e., after a full meal, Rashi), dates nullify a person's worries, intestinal sickness, and, hemorrhoids, apparently related to their laxative effect (Kesuvos 10b). The positive health benefits of date consumption may explain the statement in Berachos (57a), envisioning dates in a dream as a sign for the termination of a person's sins. Rabbi Joseph Ba-Gad, *rosh yeshiva* of B'nai Akiva's Yeshivat Nachalim, apparently is a testament to the health benefits of dates, and he "has been, for about 40 years, eating dates, with boiled water and milk, instead of breakfast and dinner." He consumes only one meal at noon and completes this meal with several dates [18]. With this diet, he is in the "best of health, cheerful, and full of energy" [19].

The above-noted citations from the Talmud stress two main health benefits of date consumption: (a) dates are a source of energy and (b) dates, possibly because of their laxative properties, prevent intestinal disorders. There is much science in support of these health benefits. Dried dates, because of their sugar content, are a high energy food, as well as a good source of potassium and iron. The total carbohydrate content in dried dates ranges from 44 to 88%. Dried dates also have a high content of dietary fiber, ranging from 6.4 to 11.5%, and apparently accounting for their laxative effects [20]. Diets high in dietary fiber have been linked to a reduced risk of "pressure diseases," such as varicose veins, hemorrhoids, and hiatus hernia, and diseases of the colon, diverticular disease, appendicitis, and the occurrence of polyps of the large in-

testines [21]. The high content of both free and total phenols in dried dates provide much antioxidant activity [22], probably accounting for its ameliorative effect on ethanol-induced gastric ulcers in laboratory rats [23] and its antimutagenic properties towards benzo(a)pyrene using tester strains of *Salmonella* [24].

Apparently, we are living in times in which the medical benefits associated with the consumption of specific food items that were noted centuries ago by our Talmudic sages are now gradually being corroborated by research conducted in laboratories throughout the world. ■

ACKNOWLEDGEMENTS

Appreciation is expressed to Rabbi Dr. Barry Mittelmann, *magid shiyur*, Agudas Yisroel of Madison, Brooklyn, NY, and to Rabbi Eli Babich, HAFTR, Long Island, NY, and the Jewish Enrichment Center, New York, NY, for reviewing portions of the manuscript.

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