

Conceptual and Logical Problems Arising from Defining Life and Death by the Presence or Absence of Circulation

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Abstract: The accepted halakhic definition of death prior to the modern era of medicine was that death occurred with the cessation of circulation and respiration. Many *poseqim* across the Orthodox spectrum believe that definition remains valid, including Rabbis Herschel Schachter and J. David Bleich. This paper claims that their definitions suffer from a lack of precision, contradict Rabbi Bleich's definition of life in his paper on conjoined twins, and lead to inchoate results when applied to modern medical achievements. These results include: if a body is divided into parts, each individual part is considered alive; a mechanical pump can fulfill the necessary criterion for life (therefore any piece of tissue attached to such a pump will live forever, or as long as the pump works); and a heart or liver donor is still alive as long as the organ is functioning in the body of the recipient. These outcomes result from viewing the body as a completely interdependent whole, and are inevitable unless a specific irreplaceable anatomic basis for the presence of life, such as the brain, is identified.



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Death by neurological criteria—commonly referred to as “brain death,”—has been criticized many times in the halakhic literature. The alternative definition describes death as the cessation of circulation and respiration.² As one author put it, “the overwhelming consensus of authoritative rabbinic opinion is that, for all legal and moral purposes, death occurs only upon cessation of both cardiac and respiratory function.”³ This definition was established in the pre-modern era of medicine and is usually viewed as the traditional one.⁴ Two of the most prominent *poseqim* in America, Rabbis Herschel Schachter and J. David Bleich have published their opinions on the halakhic definition of death. Both oppose using the irreversible cessation of brain function as a criterion for death and each has

offered criteria for determining death based on the pre-modern model. Yet these positions, offered by modern⁵ authorities and taking into account advances in modern medicine, suffer from three interrelated problems: (1) lack of precision, (2) incompatibility with an established halakhic definition of life, and (3) a tendency towards incoherent results when applied to unusual situations. An analysis reveals that the underlying issues are a lack of consideration of the anatomic basis for life, and the failure to consider all the implications of the definition.

Rabbi Schachter⁶ gives two definitions of death. The first is “our halachic legal system defines a living person as one whose blood is circulating.”⁷ Apparently, cessation of blood

1. I would like to thank the anonymous reviewers and all the family and friends that critiqued and contributed to this paper. I am particularly indebted to my wife, Ms. Marianne Novak, my parents, Dr. Emanuel and Mrs. Vivian Stadlan, and my father in law, Rabbi David Novak. Any errors in fact or logic are my own.

2. Many excellent reviews have been written on the history of the definition of death and the opinions of *poseqim* (do you want to change the spelling here?) throughout the generations. See for example Rabbi Avraham Steinberg, *Encyclopedia of Jewish Medical Ethics*, Vol. II (Feldheim, 2003), translated by Dr. Fred Rosner, pp. 695-706. Rabbi Steinberg attributes the first discussion of a direct and specific definition of death to Rabbi Moshe Sofer (known as the *Hatam Sofer*) who wrote: “If a person lies like an inanimate stone, has no pulse, and then ceases to breath, our holy Torah considers that person to be dead.” Responsa *Chatam sofer*, *Yoreh de`ab* #338.

3. Rabbi J. David Bleich so states in “Artificial Heart Implantation,” in *Contemporary Halachic Problems*, Vol. III. (KTAV, 1989), p 161.

4. Whether the use of this definition in the modern era of medicine is an accurate extension of tradition can be debated but would be the topic of a different discussion.

5. The word “modern” is used in reference both to chronology and to the branch of Orthodoxy with which these *poseqim* are usually associated.

6. Rabbi Herschel Schachter, “Determining Death,” *Journal of Halacha and Contemporary Society* 17 (spring 1989), pp. 32-40; Schachter, Rabbi Herschel, *Assia*, Vol. 7, 5754 pages 188-206. (Translations from the Hebrew are by the author). While Rabbi Schachter’s papers are more than 15 years old, he continued to advocate these positions as recently as 2006. See the report of Rabbi Josh Yuter on the Yeshiva University medical ethics conference at http://joshiyuter.com/archives/2006/09/yus_medical_ethics_conference_organ_donation_and_brain_death.php accessed 5/5/09

7. *Ibid.*, p. 36

flow is the definition of death.” He proceeds in a second definition to elaborate that life depends on the presence of three organs⁸ (ever *she-ba-neshamah teluyah bah*): the heart, the liver and the brain.⁹ He notes that there are two areas of uncertainty: whether death is defined as the absence of just one of these organs or requires the absence of all three, and whether the cessation of blood flow to an organ qualifies as its absence. He also questions whether absence of blood flow to just one organ can mean death, as that would imply that someone with a gangrenous liver (or without a liver) would be classified as dead, even though he walks and talks. Since it is unclear whether the absence of one of these organs implies death, death is defined as the absence of all three organs, while someone who lacks at least one of the three is described as possibly dead/possibly alive (*safeq met/safeq hai*) and categorized as a *goses*. He then recommends that all issues of doubt that involve a prohibition having the force of biblical law (*issur de-oraiyeta*) be resolved stringently. In the situation where a patient is missing one organ (or there is no blood flow to one of the organs), because the person may be alive, it is forbidden to remove a respirator and cause death; but because the person may be dead, a kohen should not enter the room lest he become defiled by a corpse.

Rabbi Schachter allows for transplantation of these three vital organs. During the time the organ is out of body the patient is considered a *goses*, but after it is replaced the patient reverts to normal status, a recovered *goses*. In these

articles he does not specifically address the question of whether an artificial organ (such as a mechanical heart) can be substituted for the native organ, but since he allows for transplantation, it can be inferred that the replacement of the usual human heart made from tissue with a mechanical pump would similarly be considered a transplant and not as a missing heart.

“It may be postulated that the essential criterion of death is cessation of all bodily movement.”

Rabbi Bleich maintains that “there is no life in the absence of integrated vital movement, and, conversely, whenever such movement is present, life exists.”¹⁰ Elsewhere he writes that “it may be postulated that the essential criterion of death is cessation of all bodily movement.”¹¹ He does not give a precise definition of this bodily movement, but notes that “whenever either cardiac or respiratory activity is present, the organism must be regarded as yet animate on the basis of bodily movement that is indicative of the presence of vital forces.”¹² He does not elaborate further on the definition of ‘vital forces.’¹³

Rabbi Bleich states very clearly that circulation by artificial means (mechanical pump or artificial heart) is no different from the native heart function, and is a substitution that does not affect the determination of life and death. The normal human heart secretes hormones

8. Maimonides (whom Rabbi Schachter cites for further elucidation; see App. A) makes it clear that this term does not refer to the home of the soul, but only to organs that are necessary to support life. An analogy would be that a battery is necessary for a portable computer to function, but the battery is not equivalent to the computer. However, if the source of electricity is permanently removed, the computer has irreversibly ceased to function (that is, it is “dead”).

9. For a more detailed discussion of this determination, see Appendix A.

10. Rabbi J. David Bleich, “Artificial Heart Implantation,” in *Contemporary Halachic Problems*, Vol. III, (Ktav, 1989), p. 183.

11. *Ibid.*

12. *Ibid.*, page 187.

13. Rabbi Bleich cites *Black’s Law Dictionary* (1968) as the source of the term “vital forces.”

(atrial natriuretic peptide), but Rabbi Bleich does not mention it, and therefore does not seem to require duplication of this particular function of the heart by the artificial heart or pump in order to qualify as heart function.¹⁴

A criterion for death that uses the term "body" has little meaning without a precise anatomic definition of the term.

Both Rabbi Bleich and Rabbi Schachter address the issue of decapitation based on the *Mishnah Ohalot* 1:6: "Man does not spread impurity until his soul departs. Likewise for animals. If they are decapitated, even if they are 'moving' they can spread impurity, similar to the tail of a lizard that 'moves' independently." This *mishnah* has been used to advance the theory that a decapitated person (or someone with no blood flow to the brain-physiological decapitation) should be considered dead. While in one article Rabbi Bleich allows that "total destruction of the brain might... be equated with decapitation, and the patient pronounced dead after total destruction has occurred,"¹⁵ he also notes that "decapitation may be viewed, not as constituting death merely by reason of severance of the head from the body, but because decapitation causes cessation of all vital motion."¹⁶ Therefore he does not seem to accept that removal of the head by itself implies death; it does so only if it results in cessation of all vital motion.¹⁷ Rabbi Schachter interprets this *mishnah* as describing the halakhic implications of different types of

movement, and not establishing a definition of death.¹⁸

In summary, Rabbi Bleich describes death as the absence of circulation or "vital movement" in the "body," and Rabbi Schachter defines life as the presence of circulation in three organs. Rabbi Bleich, however, does not give an anatomic definition of the term "body," or what constitutes the place where the circulation or movement needs to be found according to *halakhab*. In other words, life is defined as the presence of a function or movement, but no specifics are given as to where the function or movement needs to be measured or seen. Before the era of modern medicine, a person's survival required that all the necessary organs were present and functioning. The definition of the word "body" did not require further elucidation, because it was not possible to transplant body parts or substitute machines for organs. The body was considered one interdependent whole. In the present era, arms, legs, spleen, gallbladder, liver, lungs, intestines, heart, pancreas, and other body parts have been removed, substituted for, and/or replaced (transplanted) for various reasons without the person dying or being considered halakhically dead. A criterion for death that uses the term "body" has no applicability and little meaning without a precise anatomic definition of the term. If blood flow is the criterion for life, it should be possible to fill in the blank of this sentence: "the person is alive as long as blood flow is present in the _____ (organ, specific artery, or some part of the body)." Similarly, if movement or vital force is

14. His definition concentrates on equating circulation with movement, so it is not surprising that hormonal secretion is not considered a crucial part of heart function.

15. Rabbi J. David Bleich, "Time of Death" in *Judaism and Healing* (KTAV, 2002), p. 195.

16. *Ibid.*, page 183.

17. It is possible that Rabbi Bleich believes that decapitation uniformly results in cessation of all vital motion and that this distinction is moot. However, since he does not give specific definition of "vital motion," it is impossible to determine.

18. Rabbi Schachter, *Assia*, p. 139. The thrust of the *mishnah*, from his point of view, is to point out that the spastic movement seen after decapitation cannot be used as a sign that life is present. However, the decapitation by itself is not a sign of death. Death has to be established by other criteria.

the criterion for life, then it is necessary to specify where that movement needs to be found, and define exactly what is meant by movement or vital force.

Rabbi Schachter appears to narrow the definition of body by requiring the presence of three vital organs: heart, liver, and brain. However, the presence of just one of the organs is actually sufficient for the label of life, albeit as a *goses*. If this definition is applied precisely, it would mean that a head is not necessary for the label of life. A headless body with a beating heart, or a liver sitting on a lab bench, linked to a similarly situated pumping heart, or even possibly a mechanical pump, would be considered alive (albeit a *goses*).

The only way the blank in the paragraph above can be filled without similar results is with the word “brain.” Filling the blank with any other organ or part of the body will result either in disconnected parts of the body in the laboratory being labeled as alive, people who up to now have been considered alive now being labeled as halakhically dead, or both.¹⁹ Definitions of life based only on circulation and movement are intelligible only if the anatomic definition of the term body remains nebulous.

This lack of anatomic grounding in definitions of death becomes quite obvious when compared to the halakhah concerning conjoined (previously known as Siamese) twins. Rabbi Bleich writes²⁰ that joined bodies are considered twins (two separate halakhic lives) when two separate nervous systems are present.²¹ Two lives are present when two

separate nervous systems are present, even if the bodies share a heart and/or liver or other internal and external organs. Rabbi Bleich states that this is a well accepted concept in halakhah, and I am not certain that Rabbi Schachter would disagree.²² The corollary obviously is that if two nervous systems are not present, then the baby is considered to be only one person. Therefore, the critical factor in determining if one or two people have been born is not the presence of two complete sets of three vital organs, and is not whether two sets of “vital forces” are present, but whether there are two nervous systems. In other words, for a halakhic life to exist, a nervous system has to be present. If the nervous system is not present, then the life does not exist. While blood flow can also be a necessary factor for the presence of halakhic life, this definition of conjoined twins means that blood flow is not the only necessary factor. This is a direct contradiction of Rabbi Bleich’s contention in his definition of death that the presence or absence of “vital forces” is the only criterion for life.²³

For a halakhic life to exist, a nervous system must be present.

Rabbi Schachter’s approach fares slightly better when applied to the issue of conjoined twins, but only if the definition of an organ being present refers to its function and not its anatomic presence. While conjoined twins sometimes share hearts and livers, since both twins receive the function of the heart and liver, each twin can still be thought of as having all three vital organs. (Obviously if an

19. To be discussed in detail later.

20. Rabbi J. David Bleich, “Survey of Recent Halakhic Periodical Literature: Conjoined Twins,” *Tradition* 31:1 (1996): 92-125.

21. From Rabbi Bleich’s discussion involving being able to feel pain, have different emotions, and perform other functions, it is clear that having a brain only (and not necessarily a brain and a spinal cord) would suffice.

22. Rabbi Bleich discusses the situation where the head is only an “appendage,” and in this case there may some doubt as to whether a separate life is present or not. Of note, the discussion centers on the function of the extra head, not specifically on anatomy or whether intact brain cells are present.

23. The only way to reconcile the two would be to posit that Rabbi Bleich’s “integrated vital forces” were actually the result of the neurological activity of the brain. However, he does not make this equation in any of his papers that I have reviewed.

anatomic heart or liver is required, then the *halakhab* according to Rabbi Schachter's approach would mandate that two lives would only be present if two complete sets of organs were present, otherwise one would be considered a *goses* from the start). However, since Rabbi Schachter does not make a distinction between the brain, liver and heart (all three have the same halakhic weight, none being more important than any other), a baby born with an extra heart or liver, but not the extra brain, should be considered to be two babies, although one would be a *goses* (having only one or two of the three vital organs). There would be no halakhic distinction between having an extra head and having an extra heart or liver.

The development of artificial hearts and organ preservation further illustrates logical lacunae in the definitions

The development of artificial hearts and organ preservation further illustrates the logical lacunae in the above definitions. As long as an artificial heart is plugged in or receives a power supply, it will beat forever (assuming no mechanical breakdown problems). Therefore, a body that is connected to a mechanical pump and has resultant circulation will always be considered alive according to Rabbi Bleich's opinion. As long as there are patent arteries, one could attach a pump to a body and it would live forever because it had circulation, the only criteria for life. Also, removing the pump would be forbidden because that would

end the life. If Rabbi Schachter allows a mechanical pump to replace heart function, this problem would apply to his approach as well. On a more practical level, once a patient received a mechanical heart, it would never be permissible to turn it off or remove it without replacing it. The patient would live as long as the power was on, regardless of the condition of the body, because a machine is capable of supplying circulation; and circulation, according to these opinions, is the criterion of life.

Organs can also be preserved outside the body. A heart, liver, and other organs can be preserved on the laboratory bench outside the body as long as they receive circulation. According to the approaches of Rabbis Bleich and Schachter, these preparations could also be considered life, because they have circulation and/or intact organs, which again, are the stated criteria for life.²⁴

Since organs (and, according to Rabbi Bleich, tissue) with preserved circulation are considered life, one could actually divide a living human body into separate parts, and each part would be considered alive. According to Rabbi Schachter's definition, each vital organ could be separated out, and one body could be made into three separate entities (brain, liver, and heart), with each being considered alive as long as blood circulated through it. Rabbi Bleich's definition allows the body to be divided into an almost unlimited number of parts, each being considered alive in and of itself. Since any tissue with circulation is considered alive by his definition, one could have many separate

24. A number of other preparations could also be considered. It is possible to remove a head from one person and transfer it to the body of another. One could also keep an isolated head (separated from the body) alive for at least a few days. Both have been done in primates, and the transferred or isolated brains had EEG tracings consistent with an awake state, tracked objects with their eyes, chewed, and showed other signs of normal brain function, despite the odd circumstances. For further details see R J White, L R Wolin, L C Massopust Jr., et al, "Primate cephalic transplantation: neurogenic separation, vascular association," *Transplant Proc.* 3:1 (1971): 602-4. And Robert White, Maurice Albin, et al. "The isolation and transplantation of the brain. An historical perspective emphasizing the surgical solutions to the design of these classical models" *Neurological Research*, 18 (1996): 194-203.

sections of artery or veins attached to pumps and each would be considered alive.

This leads directly into the problem of personal identity. If one body has been divided into parts, and all of the parts are considered alive, which one is actually the person, or have more people been created? Rabbis Bleich and Schachter do not appear to have anticipated this possible result, and therefore do not address it. They also do not address a related identity issue. Almost every day hearts, livers, and other organs are transplanted. It is assumed that after the transplant the recipient is still the same person, just with a new organ. It is also assumed that the donor is obviously dead, although some organs are still functioning in a new body. The definitions of life and death as proposed by Rabbis Bleich and Schachter do not provide any basis for these assumptions. In fact, if their definitions are applied with precision, two lives are still extant in the recipient. In the case of a heart or liver transplant, since at least one of the three vital organs is still functioning and receiving circulation, according to Rabbi Schachter the donor is still alive. If both the heart and liver were transplanted from one person to another person, the recipient body now holds two of the three vital organs from the donor, and a case could be made that the recipient should actually have the identity of the donor! At the very least, the donor is still a *goses* because two-thirds of his vital organs are still functioning and receiving circulation. By Rabbi Bleich's definition, because there is still

vital function in part of the donor (the organ that is in the recipient), there is no reason to posit that the donor is dead.²⁵

Since organs with preserved circulation are considered life, one could actually divide a living human body into separate parts, and each part would be considered alive.

The definitions of death discussed here produce these results because they do not specifically address the anatomic basis of a person—the home of the soul²⁶—and fail to follow the positions on which they are based to their ultimate logical conclusions.

According to our tradition, a living human being is a combination of a body and a soul. Metaphysically and halakhically,²⁷ the moment of death is the moment of the departure of the soul.²⁸ Since we cannot objectively measure the presence or absence of a soul in the body, definitions of death are actually determinations of the earliest possible moment where certain knowledge exists that the soul has already left the body. However, if the soul were located in a particular part of the body, removal or irreversible failure of that part of the body would also mean that the soul had departed, and the person was dead.

As mentioned above, in the pre-modern era of medicine, the body could be considered one interdependent whole. The intact function of

25. One could argue that the donor organ/tissue automatically assumes the identity of the host. This may be reasonable if there is clarity regarding which participant is the donor and which is the host. If both participants are considered living human beings, it would be necessary to establish criteria as to which was the host and which was the donor, and explain why something that fulfills the criteria of life is subsumed by another and the label of life therefore removed.

26. I am indebted to the incredibly prescient papers of Rabbi Azriel Rosenfeld, zt"l, whose works I discovered while revising this paper, for helping formulate these ideas in a coherent fashion. Specifically "Human Identity: Halakhic Issues," *Tradition* 16, 3 (Spring 1977): 58-74; "Religion and the Robot," *Tradition* 8, 3, (Fall 1966): 15-26, and "The heart, the head, and the *halakhab*," *New York State Journal of Medicine* 70, 20 (1970): 2615-19. The discussion of the soul presented here is based extensively (quotes and paraphrase) on the third paper.

27. Rabbi Rosenfeld in "The heart, the head and the *Halakhab*" references *Mishnah Yevamot* 16:3, *Mishnah Ohalot* 1:6, and *Tosefta Gittin* 5:1.

28. Both Rabbi Schachter and Rabbi Bleich quote this concept. Rabbi Bleich, in discussing heart transplants and artificial hearts, also concludes that the heart is not the seat of human identity. However neither extends the logical inferences beyond that.

every organ was necessary for the preservation of function of every other organ. Failure of one organ meant certain failure of the entire body. Under these conditions, it was not necessary to consider if the soul resided specifically in one part of the body or another. No matter where the soul resided, that part of the body would fail when any of the vital organs failed. Since circulation and respiration were the most obvious and crucial systems, failure of these functions guaranteed the loss of function of the entire body, and with it, somewhere, the part that held the soul.

The brain is the home of the soul.

In the modern era of medicine, removing, transplanting, and substituting organs and body parts is relatively common. If the organ removed is the home of the soul, then removal of that organ necessarily results in the halakhic death of that person. If the body part has been removed and the person is still considered halachically alive, then obviously that part could not be the home of the soul. For example, if the heart is the home of the soul, then if the heart of A is transplanted into the body of B (and the heart of B removed and discarded), then in fact the soul of A is in the body of B. Therefore A should be considered halachically alive and B has been murdered.

Every organ and body part except the brain has been removed or transplanted without a halakhic declaration of death. The implication is that the brain is the home of the soul. Practical confirmation of this conclusion comes from consideration of conjoined twins.

The only time *halakhab* or modern society even considers whether one or two humans have been born is when the newborn has more than one head. The duplication of every other organ (including the heart) does not raise any question of multiple identities or souls. Therefore, it appears that the universally accepted *halakhab* regarding issues of organ removal, substitution and transplantation, consciously or not, is based on the brain, and only the brain, being the seat of the soul²⁹. Even if one does not wish to invoke the concept of the soul, this means that there exists a specific portion of the human anatomy without which there can be no life, and conversely, while it is present and functioning, life exists. The fact that organs can be safely transplanted and body parts safely removed makes it necessary to make a determination regarding what anatomic parts are crucial to the continued life of the person.

The exact definition of life can be discussed and debated. However, once a life is acknowledged to exist, either that life continues to exist or has ceased to exist, a condition labeled as death. For any particular life, there are two dichotomous options, life or death, and the dividing line between the two is the definition of death. If the conditions defining death are fulfilled, then the life has ended. If the conditions have not been fulfilled, the life still exists. One can also use a definition of life.³⁰ As long as the conditions for life are fulfilled, then the life continues to exist. If the conditions for life are not fulfilled, then death has occurred. There is no intermediate option between life and death, and ultimately the life has to be classified as existing or not.³¹

29. The traditional sources regarding the home of the soul are discussed in some detail by Rabbi Rosenfeld in "The heart, the head, and the *halakhab*" note 19 above.

30. The boundary between life and death is the same, no matter if one defines it from the side of life, or the side of death.

This may seem elementary and axiomatic, but application of this principle results in what may be unanticipated consequences. For example, one could define death as occurring when every neuron (brain cell) is dead. This means that as long as one brain cell is alive, the person is considered alive. Recent research has found that on routine autopsies, even when no special steps have been taken for preservation, brain cells can be cultured (and therefore are still alive) for at least eight hours after the heart has stopped and circulation has ceased.³² Therefore, if this definition is applied precisely, death should not be pronounced for at least eight hours after the heart has stopped. In addition, if some of the brain cells were removed and kept alive in cell culture (for days, weeks, or even months), the person is still not dead until those brain cells have ceased to function. It is now apparent that a seemingly reasonable definition of death applies the label of life to a few neurons in a Petri dish. If this is an unacceptable outcome, the definition is in need of revision.

A cogent definition of the border between life and death requires consideration of the logical *sequelae* and of the anatomic home of the soul, but that is not sufficient. For the purposes of this discussion, every cell or organ in the body has two properties: it is a physical piece of tissue (anatomy), and it has a specific function (physiology) that provides a direct or indirect benefit to the entire body. A definition of life, and therefore death, can require tissue, function, or both. Those that require only a function such as circulation, hepatic function,

or respiration, will have the unavoidable result of applying the label of life to any and all collections of tissue that are the beneficiary of that function. Positions that mandate the presence of the specific human organ that is supplying the function will exclude from life the situations where a machine takes over the function of the organ. Rabbi Schachter's attempt to identify the vital organs that are necessary for life is an improvement on Rabbi Bleich's function-only approach, but his anatomic choices allow for isolated hearts and livers to be considered alive (albeit as a *goses*).

A seemingly reasonable definition of death applies the label of life to a few neurons in a Petri dish.

The situation is actually a more complex. Anatomy is related to function. An organ that is present in a body does not necessarily function, or function adequately. If it is diseased or does not receive fuel and oxygen, it will cease to function. If the absence of glucose and oxygen persists, the organ will irreversibly cease to function, and in some cases the cell membranes themselves will lose integrity and become permanently incapable of utilizing energy, a state termed "cell death." Therefore, an anatomy-based definition of life and death requires a concomitant declaration as to the functional status of that piece of anatomy. It is not enough to specify that a particular piece of anatomy is required for life; the functional status of that anatomy needs to

31. *Halakbah* recognizes the category of *goses*, but a *goses* is a living person for most if not all legal purposes. Rabbi Schachter utilizes the category of *safeq met/safeq hai*, but the way it is applied it appears to be the category of life with additional stringencies. Some halakhic issues, such as establishing the start of mourning, or a specific date for *yahrzeit* are not easily resolved by resorting to a stringent position. With this concept of *safeq met/safeq hai*, there are two possible dates of death: when the patient is declared to be in that uncertain state and when he is declared definitely dead. Unless the family is going to be required to mourn twice, or observe two *yahrzeits*, a single date of death is necessary. Going even further, a life insurance policy based on the halakhic definition of death, would necessitate that the situation described as *safeq* be declared as either life or death, and the option of stringency would not be possible.

32. Verwer, Ronald W., Hermens, WTJMC, et al, "Cells in human postmortem brain tissue slices remain alive for several weeks in culture", *The FASEB Journal*, 16, 2002, 54-60.

be specified as well. It should be kept in mind that approaches that accept the substitution of mechanical function for the native function define that organ's presence not by its specific anatomic presence or by the status of its cells, but by its function. In other words, if one accepts that a pumping machine can replace a heart made of human tissue, then one is not concerned whether the heart cells are dead or alive, only with whether the pumping function has been maintained.

The definition of life based on the presence of circulation achieved widespread acceptance both in *halakhab* and in the secular world at a time when the body could be considered an indivisible whole. This definition fails to yield logically cogent results in an age when the body is no longer seen and treated as an interdependent structure. It also conflicts with the halakhic definition of life that is applied in the cases of conjoined twins as well as decisions regarding transplantation. A definition of life that identifies the brain, the seat of the soul, as the necessary beneficiary of the functions of circulation and respiration would help resolve some of the logical pitfalls. Two other concepts developed and/or applied by Rabbis Bleich and Schachter may also prove to be useful: (1) the presence or absence of an organ is defined by the presence or absence of its primary function and not by the life and death status of its constituent cells; and (2) an organ can have a secondary function (such as hormone secretion by the heart) which does not have to be considered in determining if the overall function of the organ is present.

It is not the intent of this paper to propose a halakhic definition of death. However, in order to be coherent in the era of modern medicine, whatever definition is adopted will not only need to have halakhic justification, but will have to take into account the "home of the soul" and address both anatomy and physiology. Finally, what is categorized as life under the definition should fit our established conception of life, and what is categorized as death needs to be recognizable as dead. May God grant wisdom and understanding to those who have the unenviable task of establishing such a definition.

Appendix A:

Rabbi Schachter quotes the *mishnah* in Arakhin (20a) and BT Temurah (10b), where the concept of "*ever she-ba-neshamah tehyah bah*" is mentioned. Although examples are given in the *gemara*, no specific definition of the concept is mentioned. For a specific list, he quotes Maimonides, *Mishneh torah, Hilkhot arakhin*, Chap. 2(1)), where Maimonides uses the brain, the heart and the liver as examples of organs that life is dependent upon. Rabbi Schachter rules out applying modern medical/scientific knowledge to the issue by quoting the Hazon Ish (*Yoreh de`ah* 5:3), who divided time into three two-thousand-year epochs. The second 2,000 years were designated the time of Torah, and, according to this opinion, halakhic categories established during the time of Torah cannot be changed after this time (approximately 240 C.E. according to Rabbi

Schachter). Rabbi Gil Student, in his paper “Halakhic Responses to Scientific Developments,” reviewed a number of alternative approaches and demonstrates that this approach of the Hazon Ish is not necessarily universally accepted.³³

Maimonides lived in the twelfth century, after the close of the two-thousand-year era of Torah. Therefore, according to the Hazon Ish’s categories, Maimonides’ view is in the same category as modern medical views, and therefore, according to this approach, cannot have any influence on *halakhab*. In addition, as Rabbi Schachter points out in a footnote and Rabbi Edward Reichman points out specifically,³⁴ it is possible, if not likely, that Maimonides’ view was influenced by Galen. Maimonides wrote “....You already know that his [the great sage Galen] opinion is that there are three major organs, the heart, the brain, and the liver, and that not one of these can receive power from another organ under any circumstances...”

Under the limitations of Rabbi Schachter’s application of the Hazon Ish, Maimonides can have halakhic influence under only two very specific conditions. If he was quoting *Hazal*’s view exactly without adding anything at all of his own (any personal contribution of his would come outside the limits of the era of Torah), then his view could be considered as an exact reflection of the understanding that existed before the close of the era of Torah (more than eight hundred years before he was born). The other possibility is that Maimonides’ interpretation of Galen exactly mirrored the scientific understanding of *Hazal* at the close of the era of Torah. In the second circumstance, we would also have to accept the

fact that the immutable halakhic definition of life and death is based on the mistaken science of an idol-worshipping heathen. In addition, it is quite possible if not probable that Maimonides did not think that the definitions were closed at the time the Hazon Ish did. He writes that the doctors should be consulted regarding the definition of a related halakhic category, that of human *treifot*.³⁵

A definition of life that identifies the brain as the beneficiary of the functions of circulation and respiration would resolve some pitfalls.

Rabbi Schachter does not use Maimonides’ exact definition of *ever she-ha-neshamah teluyah bah* (an organ on which the soul is dependent). Rabbi Schachter is uncertain if death is defined by the absence of all three organs, or just one organ. He resolves the issue by defining death as the absence of all three, but declares that the absence of one organ renders the person a *goses*. Maimonides (*Hilkehot arakbin* 2:1) does not express a similar uncertainty. He refers specifically to “every [other] organ the removal of which from a living person will result in death.” The simple meaning of Maimonides’ statement is that the definition of *ever she-ha-neshamah teluyah bah* is an organ whose absence from the body results in death. He does not express any uncertainty. Even assuming that Maimonides’ view somehow exactly reflects *Hazal*’s view at the end of the Hazon Ish’s two-thousand-year epoch of Torah, Rabbi Schachter’s deviation from Maimonides’ view is still a deviation from the halakhic position that he claims was closed almost eighteen hundred years ago.

33. Rabbi Gil Student, “Halachic Responses to Scientific Developments” Published online at: <http://www.aishdas.org/toratemet/science.html> 2001 (accessed 9/3/2008). The topic of *treifot* and scientific knowledge has also been reviewed recently in the journal, *Hakira*.

34. Rabbi Edward Reichman, “The Halakhic Definition of Death in Light of medical History,” *The Torah U-Madda Journal*, p. 148-174.

35. Maimonides *Hilkehot rotse’ah* 2:8. I am indebted to Rabbi David Novak, for pointing this out and providing a likely source for the Maimonides’ (*Niddah* 22b). Rabbi Schachter (Assia p. 139) in fact quotes this Maimonidean passage, but only in a discussion separating human *treifot* from animal *treifot*.