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## ***MA ADAM VA-TEDA-EHU:* HALAKHIC CRITERIA FOR DEFINING HUMAN BEINGS**

### INTRODUCTION

In this age of rapid biotechnological discovery, we witness halakhic authorities responding to biomedical advances by examining basic definitions of the human experience. For example, the first successful human heart transplant in the 1970's generated considerable debate concerning the halakhic definition of death.<sup>1</sup> The birth of the first test tube baby, Louise Brown, in 1978, initiated halakhic discussions regarding the definition of motherhood, the halakhic status of surrogate mothers, and whether babies born by way of *in vitro* fertilization are included in the formal *mitsva* of reproduction.<sup>2</sup> Today, biomedical research focusing on human cloning, embryonic stem cells, and the human genome project has prompted additional discussions, among them the fundamental question: How does halakha define a human being?

In this article we begin by describing how scientists delineate species in general, and *homo sapiens* in particular. Next, we propose specific criteria for the halakhic definition of man and examine their application to new biotechnological advances. Within the context of a scientific definition of species we also show how the underlying characteristics, so-called modern theories of human identity, were in fact foreshadowed hundreds or thousands of years ago in halakhic literature.

## SCIENTIFIC DEFINITION OF SPECIES

Approximately twenty-five hundred years ago, Aristotle proposed a classification system of animals and plants based on common physical characteristics.<sup>3</sup> This system of classification was further refined in the 18<sup>th</sup> century by Linnaeus, and revolutionized by Darwin<sup>4</sup> in the 19<sup>th</sup> when he proposed that all organisms were part of a continuum stemming from a single primeval entity. In the 1940's, Ernst Mayr expanded this classification system by proposing that species were groups of natural organisms that can only reproduce with their own kind.<sup>5</sup> Today, formulating a precise scientific definition of species, especially *homo sapiens*, has become even more difficult. The difficulty in classification arises because many essential physical and behavioral characteristics are often non-specific to a particular specie, and because science now has the capacity to alter, via genetic engineering, the physical and behavioral characteristics of plants, animals, and human beings.<sup>6</sup>

The current and future scientific capacity to genetically modify plants, animals, and even human beings raises a number of halakhic issues related to cross-breeding animals or plants, establishing whether genetically altered animals, fowl, or fish are kosher, and how we view ourselves as human beings. In an extreme situation, scientists could take advantage of the fact that humans and monkeys are estimated to be 99.4% genetically similar<sup>7</sup> and introduce into a monkey embryo the appropriate genetic information to modify the monkey to express "human-like" characteristics. For example, scientists have recently discovered a gene called FOXP2 that has a unique sequence in humans and is important in the regulation of speech and language.<sup>8</sup> Transferring the FOXP2 gene into a monkey embryo could hypothetically enable that monkey to issue utterances like a human. Transferring other human genes might alter monkeys to look more human. How would *halakha* classify such genetically altered monkeys?

## HALAKHIC CRITERIA FOR DEFINING HUMAN BEINGS

We propose that according to *halakha* a human being must possess *at least one* of the following three characteristics:

- 1) having been formed within or born from a human,
- 2) expressing moral intelligence,
- 3) being capable of producing offspring with a human.

### Species Identification in the Bible

One of the earliest sources of species identification is found in *Genesis*, which describes how all living organisms were created according to their species (*min*). It is important to highlight that the Torah states that Adam named every animal species based on his observations of their appearance: “And God formed out of the ground every beast of the field and every fowl of the sky and brought [them] to Adam to observe what he would call them and whatsoever Adam would call [every] living creature that was to be the name [species] thereof.”<sup>9</sup> Noah, in a similar manner, used his understanding of species classification to collect the appropriate animals into the ark and save the animal kingdom from the flood. *Leviticus* separates kosher (*tahor*) animals from non-kosher (*tamei*) animals according to physical characteristics, and introduces the term “*minim*,” or species, which the Talmud adopts.<sup>10</sup> Finally, the prohibition of crossbreeding animals presupposes an understanding of species identification.<sup>11</sup>

### Within or From a Human

There are only a few halakhic discussions identifying the specific criteria required in defining man as a specie. At times, sources in Tanakh, Talmud and Midrash refer to man as a *yelud isha*,<sup>12</sup> one who is born from a woman. Onkelos uses this term in the context of Adam naming his wife Hava because she is the “*em kol hai*” (*Genesis* 3:20). Onkelos translates *hai* as *enasha*, or mankind—denoting that all progeny originating from Hava are considered human.<sup>13</sup>

Hakham Tsevi (1658-1718) was probably the first halakhic authority to formulate the principle that a human being is legally defined as one who was formed within the womb of a woman.<sup>14</sup> He based his ruling on the passage in the Talmud (*Sanhedrin* 57b) where Rabbi Yishmael uses the verse from *Genesis* (9:6), “[He] who sheds the blood of *ba-adam ba-adam* [human within human] shall his blood be shed, for in the image of God made He a human,” to derive the law that it is a capital offense for a non-Jew to kill a fetus *in utero*. According to Hakham Zevi, the phrase “*ba-adam ba-adam*” teaches in addition that an organism formed within another human being is considered human, and killing it amounts to murder.<sup>15</sup>

Rabbi Eleazar Fiekeley (1754-1826) supports the view of Hakham Tsevi and states that a child born from human parents is considered human; killing such a child is regarded as murder.<sup>16</sup> Thus, any organism formed within a human or born from a human would be halakhically a

human being. Implicit in this criterion is the recognition that once a fetus attains human status<sup>17</sup> this status can never be compromised by disease, behavior, or genetic manipulation.<sup>18</sup> Furthermore, this criterion ensures that all spontaneously aborted fetuses or stillborn children be respectfully treated as human fetuses even if their appearances are abnormal. Hazon Ish (1878-1953) highlights this principle in his comments on the talmudic argument over whether an aberrant fetus which spontaneously miscarries is *metam'ei tum'at leda*.<sup>19</sup> Hazon Ish states that according to both opinions in the Talmud, these miscarried fetuses are still classified as human beings with respect to the laws of mourning and burial. In a similar vein, R. Fiekes responds to a case of a child that was born alive with gross abnormalities and states: "Let no man by any means stretch out his hand to hurt such a child or to cause his death [even] indirectly."<sup>20</sup>

In this age of *in vitro* fertilization and cloning technology, we propose to expand the halakhic criterion to include organisms whose development was initiated using cells (somatic cells, germ line cells), or nuclei obtained from human beings. This expanded criterion is based on the assumption that an organism originating from human tissue is human, and would include a child developed from an embryo that was formed *in vitro* and developed completely in an artificial incubator.

### Moral Intelligence

Rashi's commentary on *Genesis 2:7* states that a unique feature of humans is the additional God-given "*de'a ve-dibbur*."<sup>21</sup> A precise meaning of *de'a* can be inferred from Rashi's commentary to *Genesis 3:22*, which describes the ability of humans *la-da'at tov va-ra*. Rashi asserts that the uniqueness of human *da'at* is the capacity to differentiate good and evil, a characteristic not found in the animal kingdom. Thus, *da'at* refers to moral intelligence and represents another criterion in the halakhic definition of human beings. According to Rashi, IQ, intellect, or the ability to acquire factual knowledge are not essential elements in the definition of *da'at*. Further, Rashi appears to equate *sekhel* with *yode'a tov va-ra* in his description of Hava eating from the *ets ha-da'at*.<sup>22</sup> Onkelos sees Adam's uniqueness (in contrast to other animals) in his being "the only one in this world, by understanding good from evil." Rambam<sup>23</sup> explains Adam's unique status in a similar way, indicating that the capacity to differentiate good and evil may be a criterion of human identity.<sup>24</sup>

Another feature of *da'at* is stated in *Bereshit Rabba*<sup>25</sup> in the name of Rabbi Akiva, who links the capacity to differentiate good and evil with

free will.<sup>26</sup> Thus, the uniqueness of each individual is related to the interactions between moral intelligence and free will and the impact of both environmental experience and genetic makeup of the individual. However, scientific research has identified several genes that impact behavioral patterns such as violence, homosexuality, and aggressive behavior, which raises the question whether genetics impacts free will.

The narrative of Cain and Abel (*Genesis 4*) is instructive. When Cain says, “Am I my brother’s keeper?” to God’s question, “Where is Abel your brother?” Cain is washing his hands of responsibility. In contemporary terms, Cain claims that his natural (i.e., genetic), God-given makeup is responsible for his aggressive behavior and should absolve his guilt. The divine rebuttal is essentially that “sin waits on your doorstep and you have a longing for violence but you can conquer it.” God is effectively telling Cain that divine commandments demand that we overcome natural predispositions to immoral behavior. From a halakhic point of view, an element of each person’s makeup is to be tempted by sin. At the same time, each human being is also born with the moral strength to resist temptation, to structure a moral and ethical response to temptation, and ultimately to live an ethical life. The quality of moral intelligence that enables human beings to resist the temptation to sin is unique to each individual,<sup>27</sup> but the possession of moral intelligence is common to the whole species—and fundamental to its definition.

Speech may be another important element of *da’at*, as evident from Rashi’s association of speech with *da’at*. Onkelos and Ramban interpret *Genesis 2:7* to teach that the uniqueness of humans among all other life forms derives from the ability to speak. Rambam in the *Guide for the Perplexed* states that the soul is expressed in the power of speech, which is the distinguishing feature of human beings.<sup>28</sup>

However, speech may not necessarily be an independent halakhic criterion of human identity because an individual who is incapable of verbal communication is still considered human.<sup>29</sup> (Ramban observes that humans can think and understand without any physical actions.) Both modern day science and the Talmud<sup>30</sup> recognize that communication by way of sounds or movements, or unidentified behavior patterns, does occur amongst animals and between humans and animals. The *Gemara* in *Gittin* states that Rav Illish understood how birds communicated and could communicate with certain birds.<sup>31</sup> Furthermore, the Midrash states that King Solomon was able to communicate with all animals.<sup>32</sup> Nonetheless, animal communication is not equivalent to human language or speech.<sup>33</sup> Thus, the use of human speech by animals (e.g., the *nahash* speaking to Hava or the donkey speaking to Balaam) is

understood to occur by way of divine intervention, and implies nothing about their regular behavior. Human speech is distinguished from simple communication because it allows the individual to express the capacity to differentiate good and evil. Thus, speech may be one method to test for *da'at*.

The *Gemara* in *Menahot* 37a describes another situation that may relate to moral intelligence. It asks whether a two-headed individual must wear one or two pairs of *tefillin* (see *Tosafot* there). While *Menahot* 37a does not resolve the issue of whether conjoined twins are considered as one or two individuals, R. Hayyim Eleazar Shapiro, applying the principle of *safek de-Oraita le-humra*,<sup>34</sup> writes that each of the conjoined twins must put on *tefillin*. The *Shita Mekubetset* to *Menahot* 37a quotes a ruling by King Solomon that dicephalous conjoined twins (i.e., having two heads) who respond to pain independently are considered two separate persons with respect to inheritance and the laws of *tefillin*.<sup>35</sup> R. Moshe Feinstein also ruled<sup>36</sup> that Siamese twin girls that had separate brains and nervous systems were separate human beings. Thus, the human head serves as the anatomical source for *da'at* and speech and may represent a locus of *da'at*.

All of the aforementioned characteristics of moral intelligence go beyond the individual's capacity and responsibility to rationally differentiate between good and evil. In fact, *da'at* should drive a social directive to establish specific human activities and behaviors. For example, *sheva mitsvot benei Noah* elucidate some of the moral elements of *da'at*. One can view the first three *mitsvot* (the imperative to establish a justice system, and strictures against cursing God and idol worship) as reflecting an intelligence to know how the world came about through God (see Rambam, *Yesodei ha-Torah* 1:1). The fourth *mitsva* (against sexual immorality) reflects the restrictions necessary for human beings to behave appropriately within a social community: that people must socialize with others, and must partner with the appropriate mate to bear children (*Genesis* 2:18). The fifth and sixth *mitsvot* (prohibitions against murder and theft) reflect the sanctity of life and possessions. The seventh *mitsva* (not to eat flesh from a living being) reflects the human directive to rule over all the species of the world and its attendant responsibility not to be cruel toward animals.

### Human Reproductive Capacity

The Torah is the earliest written work that incorporated the term species. The Torah specifies that all animals and plants were created

“according to their *min*” and prohibits crossbreeding animal and plant species. There are references in Tanakh<sup>37</sup> and Talmud<sup>38</sup> that document that offspring were produced as a result of crossbreeding of different animals (e.g., a mule). The *Mishna* in *Bekhorot* 5b discusses the role of the birthmother and possible role of the genetic father in identifying the species of offspring resulting from crossbreeding.

In contrast, human beings represent a unique specie with respect to crossbreeding. The Talmud assumes that a human being can never successfully mate with another animal to generate viable offspring. From the biblical phrase “*ve-hayu le-vasar ehad*”<sup>39</sup> used to describe the union between man and woman, *Sanhedrin* 58a derives that only the union of man and woman can prove fruitful while the union of a human with “a domesticated animal or a wild animal is non-productive since they cannot become one flesh.” Rashi highlights this principle as well in *Rosh Hashanah* (4a), and *Tosefta Bekhorot* (1:5) explicitly states that sexual relations of humans with animals are completely unfruitful: “No animal can become pregnant from a human being and no human being can become pregnant from an animal.” Thus, humanness is related to the fact that human beings can only successfully reproduce with other human beings.

Since relations of an animal and a human can never produce offspring, there is no need for the Talmud to examine the status of an offspring resulting from such relations. The logical correlate of this statement is that if an organism can actually mate with a human and produce viable offspring, then, by definition, both parents must be human. Thus, the capacity of an organism to produce offspring with a human is another criterion of human identity.<sup>40</sup> One could view this criterion as genetic in character since the biological ability to produce offspring with another being is based on genetic concurrence and chromosome compatibility.

A Talmudic discussion regarding *dulphanin*, evidently some kind of mermaid, may support the view that human reproductive potential is a criterion for human identity. It should be noted that whether *dulphanin* were seen as real or mythological creatures is debatable. Nonetheless, the halakhic discussions highlight that our sages were willing to discuss and examine halakhic issues regarding mythical organisms or situations that they could not independently confirm as actually existing. The rabbis viewed these sources as *hokhmat ha-goyim* and were willing to deliver an appropriate halakhic response.

The Talmud in *Bekhorot* 8a states that “*dulphanin* are fruitful and multiply like humans. What are *dulphanin*? Rav Yehuda said they are

children of the sea.” Several commentaries (e.g. *Tosafot*) interpret this topic in the *Gemara* as an analysis concerning the length of time<sup>41</sup> *dulphanin* carry their young to term and conclude that it is similar to woman’s nine months. The *Gemara* also may be commenting that *dulphanin* procreate or mate like humans. However, Rashi’s version of the *Gemara*, which is also referenced by *Tosafot* as a *Tosefta* (1:5) reads that “*dulphanin* are fruitful and multiply *from* humans,” thus implying that if men have sexual relations with these *dulphanin*, the latter may become pregnant and produce offspring. Furthermore, Rashi defines the offspring of such unions as *benei yama*, or children of the sea who appear half-human and half-fish, “*sirens*” in old French. The *Sifra* comments on the use of the biblical term *nefesh*<sup>42</sup> in reference to animals of the sea and states that these are *hayat ha-yam* or *silonit*, evidently also some kind of mermaid. It is unclear why the *Sifra* asserts that these creatures do not propagate *tum’a* when they die. In his commentary to the *Sifra*, the twelfth-century Rabbi Abraham ben David of Posquières (Ra’abad) identifies these *hayat ha-yam* with the French expression quoted by Rashi, and provides a more extensive description: “The upper half of her body has the form of woman, and she sings like a human.” Since Rashi has stated elsewhere in the Talmud<sup>43</sup> that sexual relations with animals will not yield any offspring, one might suggest that Rashi would classify a *dulphan* as human based on its ability to successfully reproduce with humans.<sup>44</sup>

The *Ben Yehoyada* describes a very interesting link between the capacities to reproduce and to speak.<sup>45</sup> The author quotes a midrash stating that Hava’s punishment for eating the forbidden fruit in Gan Eden should have been immediate death. When Adam became aware of Hava’s sin and her possible death, he considered creating a female *golem* to replace her. However, the midrash goes on to explain that since Adam knew that the power of speech is linked to the capacity to conceive, and since a *golem* would not be able to speak, such a creation would be incapable of reproduction and would not serve Adam’s need to perpetuate the human species.

The need for this criterion in the halakhic definition of human beings is less obvious than the other two. Extrapolating from the case quoted in *Bekhorot* regarding *dulphanin*, this criterion may impact the definition of human beings with respect to human embryos that develop in artificial incubators (see below), robots with artificial intelligence, or life forms from other planets, if they exist.



## RABBINIC APPLICATIONS

As demonstrated in the previous section, three criteria characterize the halakhic definition of humans: a) being formed within or born from a woman, b) exhibiting *da'at* (moral intelligence), or c) exhibiting the capacity to produce progeny with another human being. However, an important issue is whether an organism requires one or all of these criteria to be classified as human. We propose from Talmudic and halakhic sources that an organism has to possess at least one of three criteria to be defined as a human being and does not need all three criteria.

In general, the halakhic criterion of being formed within or born from a person was sufficient to resolve most issues of human identity. However, careful analysis of the *golem* literature supports the concept that at least one of the above-mentioned criteria is sufficient to establish human identity. As described, the *golem*<sup>46</sup> was a being that looked human but was not formed from biological materials, nor was it formed within or born from another person. There is one source in the Talmud that deals with a being that is commonly translated as a *golem*. The *Gemara* (*Sanhedrin* 65b) relates that “Rava created a *gavra* and sent it before Rav Zeira. Rav Zeira spoke to it and it did not respond. Rav Zeira said: ‘You are a creation of one of my colleagues [incapable of speech, it lacked a *neshama*—Maharsha<sup>47</sup>]; return to your dust.’ Rav Hanina and Rav Oshaya would sit together every *erev Shabbat* and delve into the *Sefer Yetsira*. A 3-year old calf was created for them and they ate it.”

Rashi describes the *gavra* created by Rava as an artificial anthropoid<sup>48</sup> by characterizing two of its features. First, this *gavra* was created through *Sefer Yetsira*, utilizing a mystical process that recombines the letters of God’s name. Second, this *golem* did not have the power of speech. Rashi deduces the first from the adjacent passage referring to the calf of Rav Hanina and Rav Oshaya. Rashi and Maharsha deduce the second from the fact that the creature did not respond to Rav Zeira—it was that which allowed Rav Zeira to destroy the *gavra* without being guilty of murder. Ramban (*Genesis* 2:6) quotes this *Gemara* in support of Onkelos’s statement that the soul of man lies in his capacity to speak, and like Rashi, states that the soul of man imparts to him the unique capacity to understand (i.e., moral intelligence).

The *golem* has been discussed in halakhic literature with respect to issues of human identity. The *Encyclopaedia Talmudit*<sup>49</sup> states, based on an analysis of Hakham Tsevi’s repona, that a *golem* that was not born from a woman is not classified as a human being, and can be killed with

impunity. Several other *teshuvot* have stated that killing a *golem* does not constitute murder and that a *golem* need not be buried, does not convey *tum'at met*, and cannot be counted in a *minyan*. For example, R. Yaakov Emden, son of Hakham Tsevi, claims that a *golem* created by mysticism cannot be counted in a *minyan* due to its lack of intelligence.<sup>50</sup> As suggested in several articles about the *golem*,<sup>51</sup> R. Emden's statement implies that a *golem* with intelligence would be considered halakhically human.<sup>52</sup> Thus, according to R. Emden, an intelligent *golem* might be defined as a human. R. Gershom Hanokh Leiner of Radzyn,<sup>53</sup> in *Sidrei Taharot*, supports the view of R. Emden and adds that if an intelligent *golem* were created by a Jew, he would be obligated in *mitsvot* and would count for a *minyan*. These halakhic discussions are consistent with the hypothesis that an organism that was not formed within or born from a woman could be considered human if it met another criterion, i.e., moral intelligence.

In the Torah, Talmud, and Midrash, there are several other examples in which the status of organisms that were not born from women is analyzed. These examples include: *adnei ha-sadeh*; an organism that has a face of an animal, the body of a human, and the capacity to read from the Torah; and an organism that has the face of a human, the body of an animal, and acts like an animal by plowing a field.

A debate about *adnei ha-sadeh* appears in *Kil'ayyim* (8:5) with respect to the laws of crossbreeding. Tanna Kamma states that *adnei ha-sadeh* are considered *hayot*—*Tiferet Yisrael* suggests an orangutan;<sup>54</sup> Malbim, either a chimp or an orangutan<sup>55</sup>—while R. Yossi states that they have human features and can render *tum'a*. Rashi to *Job* 5:23 states that an *even ha-sadeh* has a form of a man but is in reality an animal of the field and is also called *adnei ha-sadeh*, thus identifying this creature as an animal. Rambam in his commentary also follows the opinion of Tanna Kamma that the creature is not human but rather an animal that “speaks incessantly without interruption and whose speech is similar to humans but unintelligible,” and identifies it as an *al-nasnas*, or a monkey (in Arabic). One could hypothesize from Rambam's analysis that a primary conflict is whether or not this organism possessed intelligent speech rather than whether it was born from a human. In contrast, Rash mi-Shants and R. Ovadia Bartenuira both suggest that R. Yossi believes this creature to be human. They quote the *Yerushalmi* (*Kil'ayyim* 8:4) that translates this creature as *bar nash de-tur*, or mountain man. However, it is unclear what criteria Rash and Bartenuira use to classify this organism as human.

The second examples are found in *Yerushalmi Nidda*:

What is the status of a being that appears to be entirely human-like but whose face is animal-like and it stands and reads from the Torah? Do we say to it ‘come and be slaughtered’? Or if it is entirely animal-like possessing a man-like face and it stands and plows the field, do we say to it ‘come and perform *halitsa* or *yibbum*’?

*Penei Moshe* interprets the questions as rhetorical. While other situations presented in this chapter refer to spontaneously miscarried fetuses, it is unclear whether or not this organism was born from a human mother. Nonetheless, the *Gemara* suggests that one may not kill such a being. While none of the classical responsa on issues of human identity refer to this passage, the *Gemara* does place critical importance on intelligent speech—in this case, reading from the Torah—in defining human status. Thus, it may serve as an interesting source suggesting that intelligent speech is sufficient to confer human status on an organism.<sup>56</sup> All these sources support the hypothesis that an organism possessing one criterion of humanness may be sufficient to consider it halakhically human.

## MODERN APPLICATIONS

Genetic engineering provides a platform whereby both physical and behavioral characteristics of any organism can be modified. In today’s era of molecular genetics, three other practical and theoretical examples impact the halakhic definition of human beings and are described below. The first is a being formed via reproductive cloning technology. The second is a human-derived embryo that developed *ex vivo* in artificial incubators<sup>57</sup> or using other animals as surrogate wombs. The third is a transgenic organism born from a monkey that expresses several human genes to enable it to exhibit “human-like” characteristics such as moral intelligence.

### **Cloning and in vitro fertilization**

In cloning technology, somatic cells (non-reproductive cells such as blood cells) or nuclei (containing 99% of the genetic material of all cells) can serve as donor material to initiate fetal development from an appropriate human oocyte. This process is referred to as nuclear transfer or, more commonly, reproductive human cloning. There are several

halakhic issues related to cloning technology itself which have been discussed in other articles.<sup>58</sup> Although *in vitro* fertilization is associated with many complex halakhic issues (e.g., whether this method fulfills the *mitsva* of human reproduction, who are the halakhic parents of the cloned child, whether this method of reproduction is permitted according to Jewish law), most authorities agree that the resulting child is considered a legal human being.<sup>59</sup> Since a cloned child is born from a woman, it meets at least one criteria of humanness. Furthermore, halakha does not distinguish whether a fetus is formed from a sperm and an egg, or from a somatic cell and an egg, but does implicitly require the use of a human genome for development.

#### **Fetal development in non-human incubators**

The second case is an organism formed by a human egg and sperm through *in vitro* fertilization, and gestated within an artificial incubator without the use of a surrogate mother. A child formed in an artificial incubator will attain full human status according to our proposed definition provided the child emerges as a physiologically normal child. While not born from a woman, the child would still meet other criteria of humanness such as *da'at* and/or human reproductive capacity. One might even provide further evidence that such a child is human from the fact that Hava had full human status even though she was not formed in another human but rather from human tissue taken from Adam. Similar evidence emerges from the case of an intelligent *golem* who, according to several halakhic authorities, would be human even though not born from a human. Similarly, if technology were ever developed that allowed fetal development and gestation in a man, then such a child would also retain full human status. A more complex situation to resolve is the status of a child “born” from an artificial incubator or surrogate animal that is severely learning impaired, does not possess moral intelligence and/or speech, and is sterile. Since such a child would be formed from human tissue, it would attain full status as a human being even though development occurred outside the woman’s womb, and even though it would be physically, or mentally handicapped.

#### **Transgenic monkeys**

As mentioned above, a recent scientific breakthrough has identified a human gene called FOXP2 that is critical in speech and language development. What would be the halakhic status of a transgenic monkey<sup>60</sup>

that is born from a monkey, looks like a monkey, but possesses the genetic information sufficient to enable it to exhibit human-like speech or moral intelligence (assuming that moral intelligence is genetically influenced)? Would the halakhic definition change if the genetic information inserted into this monkey's genome were from DNA synthesized in a laboratory and was not derived from any human sources? One might propose that if this, or any, organism expressed moral intelligence it would be considered human. While the creation of such a transgenic monkey expressing human characteristics may be viewed as human, it could never be "born" Jewish. To be born Jewish requires one of the following conditions: a human oocyte obtained from a Jewish woman and/or being born from the womb of a Jewish woman or possibly also from a transplanted ovum obtained from a Jewish woman.

What would be the status of a transgenic monkey carrying human genes that enabled it to develop a human face and/or human body, but exhibit the same behavioral characteristics as other monkeys, i.e., it did not express moral intelligence? Since it probably would not be capable of producing offspring with another human being for lack of genomic compatibility, it would not exhibit any of the identified criteria of human identity. Thus, it would not be classified as human according to halakha.

## CONCLUSIONS

According to Ramban, God gave people the right to master all powers embedded in the physical, chemical, biological and genetic sciences in order to master the world.<sup>61</sup> Rambam also attributes great significance to understanding scientific processes. In *Hilkhot Yesodei ha-Torah* (2:2), Rambam states that one pathway to achieve "love of God" is through understanding His works, His creations, and His scientific wonders. While science and technology are supposed to be utilized to achieve lofty aims, care must be taken that these are applied to benefit humankind rather than for destructive purposes. This message is foreshadowed by the midrash: "Said R. Elazar, 'The sword and book descended intertwined from heaven. If you do what is written in this Book you will be successful with the sword. If you do not follow the Book, the sword will kill you'" (*Devarim Rabba* 4:1). Technology like the DNA helical structure is intertwined with moral imperatives. The moral codes within the Torah protect us against inappropriate use of technology and its potential to destroy us; the sword may be trans-

formed into an implement used for harvesting grain, or for *mitsvot* like *mila* and *shehita*.<sup>62</sup> The power of genetic technology for creating transgenic animals, cloning, or genetic engineering is both exhilarating and frightening. While it offers the promise of new medical therapies, it is halakhically forbidden to utilize these technologies for non-therapeutic purposes or for situations that lead to unjustified harm or destruction. These biotechnologies can only be explored and utilized as potential therapies.

In summary, we proposed three criteria for the halakhic definition of humanness: being formed within a person or born from a person, possessing moral intelligence, or being capable of producing offspring with another human. These three criteria are alluded to in *Genesis* where God defines human beings (5:1-2):

This is the book of the generations of man on the day that God created man, in the likeness of God did He make him. Male and female did He create them and blessed them and called their names ‘man’ on the day when they were created.

As cited above, Ramban interprets these verses to mean that God declared that any descendants of Adam and Hava are human—consistent with the criterion that all organisms born from a human are halakhically human. In addition, the verse states that in the image of God did he create them. Seforno interprets this phrase to signify that humans were created with the likeness of God that is exhibited by *da’at*.<sup>63</sup> Finally, Ramban explains the phrase “He blessed them” to mean that God blessed them with the *unique* capacity to reproduce only with each other. This corresponds to the criterion of human reproductive capacity. Embedded in these two verses are the three major criteria for defining human species according to halakha, adding perhaps a modern twist to the statement of Ben Azzai that in these verses may be found a great principle of the Torah.<sup>64</sup>

NOTES

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1. F. Rosner and M. D. Tendler, "Definition of Death in Judaism," *Journal of Halacha and Contemporary Society* 17:14-32 (1989); R. Aaron Soloveichik, "The Halakhic Definition of Death," in *Jewish Bioethics* (Fred Rosner and J. David Bleich, eds), KTAV Publishing House: Hoboken, NJ, pp. 317-324 (2000).
2. Tendler, M.D., "Rabbinic Comment: in vitro fertilization and extra uterine pregnancy," *Mt. Sinai J Med*, 51:7-11 (1984); J. David Bleich, "Test-Tube Babies," in *Jewish Bioethics*, pp. 99-104.
3. See Goerke, Helmut, *Linnaeus*, New York: Charles Scribner's Sons (1973).
4. Darwin, Charles. *The Origin of Species by Means of Natural Selection, or the Preservation of Favored Races in the Struggle for Life*, New York: Avenel Books (1970).
5. Mayr, Ernest, *Systematics and the Origin of Species*, New York: Columbia University Press (1944).
6. Hey, Jody. *Genes, Categories, and Species*, New York: Oxford Press (2001).
7. Fjuiyama, Asao, et. al., "Construction and Analysis of a Human-Chimpanzee Comparative Clone Map," *Science* 295, pp. 131-137 (2002).
8. Enard W, Przeworski M, Fisher SE, Lai CS, Wiebe V, Kitano T, Monaco AP, Paabo S, "Molecular Evolution of FOXP2, a gene involved in speech and language," *Nature* 418, pp. 869-72 (2002).
9. *Genesis* 2:19; see Ramban who states that Adam saw how inferior and distinct each animal was compared to him, and also what was at the core of each animal's being and nature.
10. *Hullin* 63.
11. *Tosefta Kil'ayyim* (1: 5).
12. *Job* 14:1; 15:14; 25:4; *Avot of Rabbenu Natan*, Chapter 2; *Yoma* 75b; *Nidda* 13a; *Devarim Rabba* (Vilna) 35:2; *Bamidbar Rabba* 4:1; *Tanhuma* (Warsaw), *Mishpatim* 19, *Pekkudei* 3, *Bamidbar* 19, and *Ha'azinu* 1.
13. There is an interesting comment by Ibn Ezra on Yaakov's blessing to Judah (*Genesis* 49:10) which links the term "shilo" to "shilyita," or placenta (see *Devarim* 28:57). In making the connection, Ibn Ezra suggests that the ultimate Messiah will be naturally born to woman.
14. Responsa of Hakham Tsevi, 93. One outcome from this responsum is that if an artificial human, say a *golem*, were created, there would be no prohibition to kill such a being (see R. Moses Cordovero, *Pardes Rimmonim*, Chapter 24, sec. 10, and R. Abraham Azulai, *Hesed le-Avraham*). *Ma'ayan Revi'i*, nahar 30 also seems to propose that killing a *golem* does not constitute homicide. In contrast, R. Hayyim Eleazar Shapira, *Darkei Teshuva*, *Yoreh De'a*, 7:11, seems to assume that Hakham Tsevi believes that a *golem* is human. Thus, there may be some ambiguity as to the final position of Hakham Tsevi regarding this issue. For a more comprehensive discussion regarding the final position of Hakham Tsevi, see Rabbi J. David Bleich,

