

Gestational Surrogacy

By: JOHN D. LOIKE and MOSHE D. TENDLER

Introduction

Gestational surrogacy is resorted to when an infertile couple cannot gestate an embryo to term. Previous secular and halakhic articles on gestational surrogacy are based on the traditional position that a surrogate mother serves as a “substitute womb” to nurture and gestate a genetically **unrelated** embryo without significantly contributing to the future physiological or behavioral attributes of the child. This position is no longer tenable. Emerging scientific data on maternal-fetal cellular transfer and epigenetics transform the role of a surrogate as a substitute womb into a cooperative health partnership between the surrogate, the fetus, and the biological parents. The choices infertile couples make in recruiting prospective surrogates may be greatly influenced by their understanding that maternal-fetal cell exchange and epigenetics processes create lifelong biological and genetic connections between the surrogate and the fetus.

In 1978, the first test tube baby, Louise Brown, changed reproductive medicine and infertility in previously unimaginable ways. Louise Brown was conceived via *in vitro* fertilization (IVF) in which a woman’s egg was fertilized by sperm in a test tube and the resultant embryo was then implanted into Louise’s mother’s uterus. Louise Brown was born and made the headlines of major journals and newspapers. Today, IVF has produced over 5 million babies worldwide and is part of the standard protocol of ART.¹

IVF technology opened the scientific door to develop gestational surrogacy.² Currently, a surrogate is recruited by a couple whose wife, because of medical reasons, cannot gestate a fetus. In these situations, the couple donates their sperm and eggs for IVF and a resultant embryo is

¹ <<http://www.wbir.com/health/article/225600/3/5-million-IVF-babies-born>>.

² Armour, K.L. “An Overview of Surrogacy Around the World,” *Nursing for Women’s Health*, 16, 231–236, 2012.

Dr. John D. Loike (corresponding author, jdl5@columbia.edu), Department of Physiology and Cellular Biophysics, Center for Bioethics, Columbia University College of Physicians and Surgeons, NY.
Rabbi Dr. Moshe D. Tendler, Department of Biology, Yeshiva University, NY.

then implanted into the recruited surrogate to carry and give birth. The last published statistics in 2008 showed that over 1,400 babies were born using gestational surrogates in the United States. These numbers may not be accurate since many couples do not report using a surrogate. Recently, many television and movie celebrities have commissioned surrogate women to bear their children, increasing the public awareness and acceptance of gestational surrogacy for medical or non-medical reasons.³

Current scientific research reveals that there is a significant biological and genetic relationship between the surrogate and the fetus she is carrying. As a consequence of these scientific findings there are significant halakhic concerns: 1) who is the halakhic mother of a child born from a surrogate, the genetic or the gestational mother? 2) can a Jewish woman serve as a surrogate? 3) can surrogacy be practiced within a halakhic framework?

The case study described in this paper is of a Jewish couple whose wife is medically incapable of gestating a fetus to term but the husband is fertile. The couple chooses to provide their own sperm and eggs for IVF fertilization, and one resulting embryo is then implanted into a surrogate woman whom the couple specifically recruits to gestate the embryo and give birth to a child. Sidestepping the national debate on who is legally the mother, in this article we assume that the genetic donors are contractually designated as the legal parents of the child, in accord with secular law.⁴

In this article, we first present the current scientific data demonstrating a greater biological relationship between the surrogate and the fetus she is carrying. We highlight how maternal-fetal cell exchange and epigenetics processes that occur in surrogacy, establish intimate biological connections that last for the duration of both the life of the surrogate and the child she gestates. We then summarize the criteria used by various rabbinical authorities in establishing who is considered the halakhic mother in gestational surrogacy. In addition, we outline other halakhic considerations such as financial considerations, autonomy, and privacy issues that relate to gestational surrogacy. Finally, we briefly discuss the issue of whether a Jewish woman can serve as a surrogate. A more comprehensive

³ <<http://www.fertilitynation.com/celebrities-whove-used-surrogacy-and-other-infertility-treatments-part-1/>>;

<<http://www.babble.com/CS/blogs/famecrawler/archive/2009/05/05/celebrities-who-have-used-surrogates.aspx>>.

⁴ Margalit, Y., Levy, O., Loike, J.D., "Advanced Reproductive Technologies: Reevaluating Modern Parentage" *Harvard Journal of Law and Gender*. In Press, 2013.

analysis of whether a single or married Jewish woman can serve as a surrogate is presented elsewhere.⁵ Finally, we present a paradigm of how surrogacy can be effectively employed within a halakhic framework.

New Scientific Research Related to Pregnancy

Maternal-Fetal Cell Transfer: The current public perception is that the placenta of a pregnant woman serves as both a physical and biological barrier between the woman and the fetus she is carrying. In 1893, data were first presented showing the presence of fetal cells in the lungs of 17 women who died from complications of eclampsia.⁶ Since then, more than 1,000 scientific journal articles have presented data showing that during pregnancy stem cells from the fetus traverse the placenta and implant into various tissues of the host mother.⁷ These implanted fetal stem cells proliferate in many organ systems of the mother, such as the brain, and remain there for her entire life.⁸ Furthermore, stem cells from the mother traverse the placenta and implant into various tissues of the fetus. This bidirectional stem cell exchange between a pregnant woman and her fetus underscores the fact that the mother and fetus are intimately and biologically connected beyond the defined time that the fetus is gestating in the womb. In practical terms, maternal-fetal cell exchange highlights that a pregnant woman carries three generations of cells in her body: her mother's, her own, and her fetus's.

Scientific research also reveals that fetal cells in a pregnant woman have potential health and diagnostic value. The presence of fetal cells in all pregnant women in the first trimester may actually help the mother's immune system tolerate the fetus. Since a fetus can be considered immunologically, as a foreign growth, the pregnant mother's immune system

⁵ Loike, John D. and Tendler, Moshe D., "Recruiting a Surrogate for an Infertile Jewish Couple," *Journal of Halacha and Contemporary Society*. 44:5-20, 2013.

⁶ Lapaire O, et al., "Georg Schmorl on trophoblasts in the maternal circulation," *Placenta*, 28: 1-6, 2007.

⁷ Klonisch T, and Drouin R, "Fetal-maternal exchange of multipotent stem/progenitor cells: microchimerism in diagnosis and disease," *Trends in molecular medicine*, 5(11):510-518, 2009.

⁸ Gammill, HS, et al., "Effect of parity on fetal and maternal microchimerism: interaction of grafts within a host?" *Blood*, 116:2706-2712, 2010; Kara, RJ, et al., "Fetal Cells Traffic to Injured Maternal Myocardium and Undergo Cardiac Differentiation Novelty and Significance," *Circulation Research*, 110:82-93, 2012; Seppanen, EJ, et al., "Fetal microchimeric cells in a fetus-treats-its-mother paradigm do not contribute to dystrophin production in serially-parous mdx females" *Stem Cells and Development*, 21: 2809-2816, 2012.

must adapt to the “foreign fetus” and refrain from rejecting it. This is called immunological tolerance and occurs early in pregnancy and may be one beneficial reason for fetal cells traversing the placenta into the host mother.⁹ In addition, changes in the hormonal profile of the pregnant woman may also suppress her immune system to allow the fetus to develop without being immunologically rejected.¹⁰

The continued presence of these fetal cells in a woman after she gives birth may have health benefits and risks. Dr. Lee Nelson of the Fred Hutchinson Cancer Research Center assessed the number of male fetal cells in autopsied brains of women who died between the ages of 32 and 101. His research uncovered a clinical association—those women who were diagnosed with Alzheimer’s disease had significantly less male fetal stem cells in their brains than women who did not have the disease. This study suggests that the presence of fetal stem cells in a woman exerts a lifelong protective effect for Alzheimer’s disease.¹¹ In other studies, evidence is presented that shows how fetal cells present in a pregnant woman are capable of accelerating repair of damaged heart tissue and pancreas, thereby providing protective benefits to the woman against heart disease and type-1 diabetes.¹² Studies have also shown that fetal cells in the mother may be associated with a better survival outcome from certain types of cancer.¹³

There are also health risks resulting from fetal cells implanting into various tissues of a pregnant woman. Several studies have shown that the presence of fetal cells in women was strongly associated with a lifelong **reduced** risk of developing breast cancer but an **increased** risk of developing colon cancer.¹⁴ Other studies have shown that the presence of fetal

⁹ Dutta, P, Burlingham, WJ, “Microchimerism: tolerance vs. sensitization” *Curr Opin Organ Transplant*, 16:359–365, 2011; Daunter, B, “Immunology of pregnancy: towards a unifying hypothesis,” *Eur. J. Obstet. Gynecol. Reprod. Biol.*, 43:81–95, 1992.

¹⁰ Ansar Ahmed, S, Penhale, WJ, and Talal, N, “Sex hormones, immune responses, and autoimmune diseases. Mechanisms of sex hormone action” *Am J Pathol*, 121(3): 531–551, 1985.

¹¹ Chan, WF, *et al.*, “Male microchimerism in the human female brain.” *PLoS One*, 7: e45592, 2012.

¹² Roy, E, *et al.* “Specific maternal microchimeric T cells targeting fetal antigens in β cells predispose to auto-immune diabetes in the child,” *Journal of autoimmunity*, 36:253–262, 2011.

¹³ Kamper-Jørgensen, M, “Microchimerism and survival after breast and colon cancer diagnosis,” *Chimerism*, 3:72 – 73, 2012.

¹⁴ Kallenbach, LR, *et al.*, “Fetal cell microchimerism and cancer: a nexus of reproduction, immunology, and tumor biology,” *Cancer research*, 71:8–12, 2011;

cells in women is associated with an increased risk of autoimmune diseases.¹⁵

There also may be future diagnostic benefits in obtaining these fetal cells from the pregnant woman. Various research centers are exploring new methods to obtain small numbers of fetal cells from the blood of pregnant women who have a history of being carriers of genetic diseases, such as fragile X, Tay Sachs, and cystic fibrosis. Obtaining just 2-5 of these fetal cells will allow clinicians to screen, very early in the pregnancy, for the presence of specific genetic mutations in fetal DNA. Using maternal blood as the source of fetal cells is a minimally invasive prenatal screening procedure that avoids medical risks associated with conventional invasive procedures, such as amniocentesis and chorionic-villus sampling, commonly used to obtain fetal DNA. If fetal cells can be obtained from the blood of a pregnant woman before 40 days of gestation, and found to contain genetic disease markers, then many halakhic authorities would allow termination of the pregnancy when there are medical risks to the mother or serious abnormalities to the fetus.

The potential health benefits and risks of maternal cells that have been implanted into the fetus are much less understood. It is believed that maternal cells in the developing fetus may benefit the fetus by suppressing its immune system from immunologically responding, negatively, to “foreign” maternal antigens. In terms of health risks, clinical reports cite almost 20 cases where maternal cells implanted into the fetus caused the child to be born with a tumor that originated from maternal cells.¹⁶ Another potential risk to the fetus can arise from maternal cells that carry dangerous viruses that could become activated during pregnancy or after the child is born. These activated viruses could affect the future health of the child.

Epigenetics and Environment: It is common knowledge that most inheritable diseases result from changes in the sequence (the alphabet code) of DNA, the genetic instructions of human beings and all life forms. This genetic information is encoded as a sequence of nucleotides (guanine, adenine, thymine, and cytosine) and recorded using the letters G, A, T, and

Kamper-Jørgensen, M, et al., “Opposite effects of microchimerism on breast and colon cancer,” *European Journal of Cancer*, 48:2227–2235, 2012.

¹⁵ Ibid note 7 and Lepez, T, et al., “Fetal microchimeric cells in blood and thyroid glands of women with an autoimmune thyroid disease,” *Chimerism*, 3:21–23, 2012.

¹⁶ Isoda, T, et al., “Immunologically silent cancer clone transmission from mother to offspring,” *Proc Natl Acad Sci, U S A* 106:17882–17885, 2009; Alexander, A, et al., “Metastatic melanoma in pregnancy: risk of transplacental metastases in the infant,” *J Clin Oncol*, 21:2179–2186, 2003.

C. This sequence of the DNA code can be described as the central processing unit of the cell. These instructions contain the essential information about the various 200,000 proteins that are encoded in the ~20,000 human genes. The order or sequence of the DNA nucleotides in the human genome determines the information available for developing and maintaining an organism, similar to the way in which letters of the alphabet appear in a set of instructions to form words and sentences. Changes in the order or sequence of the DNA nucleotides can, at times, have profound effects on the health of a person. Many diseases, such as Tay Sachs, cystic fibrosis, and Fragile X result from such changes in the sequence or order of the DNA code. The sequence of the DNA code in human genes can also influence the incidence of a person developing a variety of serious diseases such as cancer, heart disease, diabetes, and neurodegenerative diseases.

Epigenetics is the study of chemical reactions that control which proteins a specific cell type produces by switching genes off and on at strategic times during a person's lifetime.¹⁷ Thus, epigenetics can be described as the software program that provides essential instruction on which genes are necessary for each specialized cell type to function properly. A muscle cell, for example, requires a unique set of active genes to function like a contracting cell, and a nerve cell requires its unique set of active genes to enable it to transmit sensory signals to and from the brain.

An important aspect of epigenetics is that these unique sets of instructions can be inherited from one generation to another without altering the DNA order or sequence. Epigenetics thus provides potential answers to underlying causes of many diseases, longevity, and the longstanding unresolved question of how nature and nurture impact health and behavior. In fact, the ways environmental factors (such as diet, living conditions, exercise, stress, chemicals, drugs, and toxins) can positively or negatively affect inheritable characteristics of an individual operate through epigenetic processes. Although identical twins have the same DNA code, their different environmental experiences manifest epigenetically. As identical twins age, they exhibit differences in behavioral responses, physical appearances, or even susceptibilities to various diseases.

Human diet and stress is another example that indelibly changes the epigenetic information of sperm and eggs that is passed on to future generations. These types of studies demonstrate how epigenetics instructs the individual that "you and your future descendants are influenced by what

¹⁷ Bird A, "Perceptions of epigenetics," *Nature*, 447:396–398, 2007; Conaway, Joan W. "Introduction to Theme 'Chromatin, Epigenetics, and Transcription?'" *Annual review of biochemistry*, 81: 61–64 2012.

you eat” and provides more credence to the folk adage that “you are what you eat.” In a recent report, for example, an unbalanced maternal diet in pregnancy was found to be associated with offspring exhibiting epigenetic changes in genes controlling cardiovascular disease risk, obesity, and fetal growth.¹⁸

Another study on epigenetics showed that increased maternal weight gain during pregnancy increases birth weight and influences the long-term risk of obesity-related disease in offspring.¹⁹ In other words, the amount of weight that a woman gains during pregnancy can influence, via epigenetics, the probability of her offspring and future descendants becoming prone to obesity. Other studies present evidence that offspring, whose mothers or grandmothers smoked during pregnancy, have an increased risk of asthma in childhood.²⁰ In summary, environmental factors, such as the hormonal environment of the pregnant woman, as well as her diet, lifestyle, and psychological state, are likely to influence the personality (e.g., spirituality characteristics and sexual preference)²¹ and health of the fetus via epigenetic mechanisms.²²

Epigenetic regulation is also central to the phenomenon of genomic imprinting or the parent-of-origin expression of genes and proteins.²³ The genetic mother and father each contribute a specific set of genes that controls fetal development. Determining whether a specific expressed gene originates from the father’s or mother’s DNA is called genetic imprinting. Imprinted genes not only control embryonic development but also can impact a child’s behavioral characteristics and metabolism later in life. Altering normal imprinting patterns or inappropriate imprinting can lead to well-characterized disorders, including Prader-Willi and Angelman Syndromes.

While maternal-fetal cell exchange has been well documented in women who conceive and carry their own child, there are now several

¹⁸ Drake, AJ, *et al.*, “An unbalanced maternal diet in pregnancy associates with offspring epigenetic changes in genes controlling glucocorticoid action and fetal growth” *Clinical Endocrinology*, 77:808–815, 2012.

¹⁹ Poston, L, “Maternal obesity, gestational weight gain and diet as determinants of offspring long term health” *Best Practice & Research Clinical Endocrinology & Metabolism*, 26:627–639, 2012.

²⁰ <http://www.sciencedaily.com/releases/2011/05/110518105511.htm>.

²¹ Sargent, M, “Epigenetics: Different under the skin” *Nature*, 487:298-299, 2012.

²² Ballestar, E, “Epigenetic contributions in autoimmune disease” Preface. *Adv. Exp. Med. Biol.*, 711: v-vi, 2011.

²³ For a review see Maccani, MA, & Marsit, CJ, “Epigenetics in the Placenta,” *American Journal of Reproductive Immunology*, 62:78–89, 2009.

studies of animal and human surrogacy indicating that this process occurs in surrogacy as well.²⁴ Recognizing that these biological processes occur in gestational surrogates might have profound implications on the medical and psychological state of the surrogate, the genetic parents, and fetus, as well as the halakhic status of the child.

Potential Psychological Consequences of Bidirectional Fetal-maternal Cell Exchange and Epigenetics in Surrogacy

As discussed above, bi-directional cell exchange and epigenetic processes can affect the health of the surrogate or the fetus that a woman is carrying. There are also psychological repercussions that may develop from these scientific processes. The surrogate's attitudes and feelings may change upon discovering that she is not merely a host mother but someone who makes real biological and epigenetic contributions to the development of this fetus/child. Her epigenetic fingerprint that is transferred to the unrelated fetus, may eventually contribute to future health risks of the child—the very reason most gestational carriers report they are trying to use egg donors.²⁵ Surrogates, who previously believed they could relinquish a non-genetically related baby might be more reluctant to engage in surrogacy for fear that it will be even more difficult to give up the baby. Will this knowledge influence the likelihood that the surrogate mother will want to keep or reject an unhealthy fetus? Will the surrogate want to play a greater role as the child matures rather than maintaining anonymity?

Halakhic Analysis of Gestational Surrogacy

There are several halakhic issues related to gestational surrogacy that have been presented in many articles.²⁶ These include: 1) who is the halakhic mother of the child (specifically as it relates to the religious status of the child if either the genetic or the birth mother is **not** Jewish) and the related

²⁴ Williams Z, Zepf D, Longtine J, Anchan R, Broadman B, et al. (2009) "Foreign fetal cells persist in the maternal circulation." *Fertil Steril* 91: 2593–2595; Mitchell S, James A (1999) "Severe hemolytic disease from rhesus anti-C antibodies in a surrogate pregnancy after oocyte donation: a case report." *Journal of reproductive medicine* 44: 388–390.

²⁵ Burry, KA, "Reproductive medicine: where we have been, where we are, where are we going? An ethical perspective" *American Journal of Obstetrics and Gynecology*, 196: 578–580, 2007.

²⁶ See Avraham Steinberg and Fred Rosner, *Encyclopedia of Jewish Medical Ethics*, Feldheim Publishers, New York, pp. 571–585, 2003.

issue, who are the halakhic siblings and relatives of this child? 2) will surrogacy enable the infertile couple to fulfill the religious duties of procreation (*p'ru u-r'vu*)? 3) how does surrogacy influence the laws of inheritance? and 4) is the issue of a bastardy (*mamzer*) of concern in assessing the religious status of a child born via a surrogate?

Two issues not previously discussed in the literature: 1) the halakhic import of the new scientific research in maternal-fetal cell exchange and epigenetics, and 2) Can a Jewish woman serve as a surrogate?

Defining Halakhic Motherhood: Historically there have been three major positions²⁷ regarding the issue who the halakhic mother of the child is:

- 1) The genetic mother (i.e., the woman who donated the egg for IVF),
- 2) The gestational surrogate who gave birth to the child,
- 3) Both the genetic and gestational women.

Selected Biblical and Talmudic Sources Supporting Each Position

The genetic mother of the child serves as the halakhic mother: There is a growing trend among Israel's influential rabbinical arbiters to rule that in IVF, the woman who donates the eggs is the child's halakhic mother—even if she is not Jewish.²⁸ Several sources support this position.²⁹

- *Sanhedrin* 91b quotes the story that Rebbi agreed with Antoninus that the soul of a person enters the embryo at the moment of conception,³⁰ as soon as it is “decreed” (from the moment that “God decrees its destiny”). If ensoulment of the fetus occurs at conception then the genetic mother should be the halakhic mother of the child. Is ensoulment equated with parenthood?

²⁷ There is a minority opinion presented by Rabbi Eliezer Waldenberg that a child born via *in vitro* fertilization (IVF) has no legal mother (even if the same woman is the egg donor and birth mother) and prohibits the procedure [Waldenberg, E. (1986). Responsa *Tzitz Eliezer*, part 15 #45. Jerusalem]. In part, he believes that IVF is an unnatural process that is initiated outside the body of a woman. Thus, conception via IVF does not confer halakhic genealogy. Finally, if donor sperm is used, Rabbi Waldenberg suggests that the child may be a *safek mamzer*.

²⁸ Siegel-Itzkovich, J. “Rabbis change views on who's the “mother” of IVF children,” *The Jerusalem Post*, Jan. 25, 2010.

²⁹ See Rabbi Ezra Bick, “Maternity in Fetal Transplants,” Crossroads Zomet Publishing, Gush Etzion, Israel, pg 79–85, 1987.

³⁰ For example, Rashi states that *pekidah* means from the moment that the angel brings the first “drop” to God to predict its future. Moreover, the term “decreed” (*pekidah*) used by Rebbi is not concretely defined in the Talmud and could mean either conception or implantation.

- *Niddah* 31a delineates three partners in the creation of a child: the mother, father, and God. Rabbi Shlomo Goren, for example, interprets this statement to mean that halakhic paternity and maternity are established at conception.³¹ It is important to note that paternity is established at conception because the father's role is primarily to fertilize the egg.
- *Yevamot* 78a states that if a non-Jewish woman becomes a proselyte during pregnancy, when she gives birth, her son does not require immersion, in a *mikvah*, to be considered Jewish. The Talmud assumes the child to have been converted at the same time as the mother because at the time of conversion the fetus was considered part of the mother's body. This ruling assumes that maternity is established during gestation. It is important to note that maternity may not represent a single event (i.e. fertilization) but may consist of complex processes including fertilization, gestation, and giving birth to the child.
- *Yevamot* 42a states that if a married couple converts, they must separate for three months to make certain that a subsequent child born to them was conceived after their conversion. The three-month waiting period requirement suggests that conception determines maternity rather than birth.
- Rambam³² discusses various laws of a *halal*—a child born from a halakhically illegal union between a *Kohen* and a divorcee. Rambam states that if a *Kohen* marries a pregnant divorcee, her child is legitimate (and not considered a *halal*) because the child was not conceived in sin.

*The gestational surrogate who gives birth to the child is the halakhic mother:*³³

- Exodus 21:22 discusses a case where one man injures a pregnant woman causing her to miscarry her fetus “so that she aborts and no maternal death occurs, he shall be surely fined, . . .and he shall pay as the judges determine.” This verse thus refers to the fetus she is carrying as “her child” and hints that the unborn fetus belongs to the woman carrying it. In this case the woman gestating the fetus is both the gestational and genetic mother.

³¹ Goren, S, Hatzofeh, 7 Adar I, 1984; Rabbi Z. N. Goldberg, *Tehumin*, Vol 5, 5744, pp. 248–259 and 269–274, 1984.

³² Rambam, *Mishneh Torah, Issurei Bi'ah*, 19:7.

³³ Ibid no. 23 and Rabbi Zalman Nechemia Goldberg “Maternity in Fetal Implants,” Crossroads Zomet Publishing, Gush Etzion, Israel, pp. 71–77, 1987.

- *Ubar yerekeh immo* is a halakhic term that describes the fetus as being considered as a limb of the pregnant woman and acquiring her religious status as well.
- *Yevamot* 97b explores the status of a woman who converts to Judaism after conceiving twin boys but before giving birth to them. From this discussion in the Talmud, the halakha rules that these twin boys are maternal brothers, but not paternal brothers, because the birthing process establishes maternal brotherhood. It is important to highlight that this case relates to the halakhic principle of *ein yihas le'aqum*—there is no family relationship established when a Jewish man has relations with a non-Jew and produces a child. The Jewish man who had relations with the non-Jew has severed any familial ties with any child produced.
- *Sifra* on Leviticus 12:2 questions the status of a child whose mother became pregnant before *Matan Torah* and gave birth after *Matan Torah* and concludes that the laws depend on when the child was born (and not conceived). *Matan Torah* included a ritual act of conversion. The cloud covering Mt. Sinai represented immersion (*tevila*) and the people expressed their decision to accept all the mitzvot of the Torah. Thus, the fetus, like its mother, became Jewish through the conversion process at *Matan Torah*.
- *Megillah* 13a interprets the verse in *Megillat Esther* 2:7 “And he brought up Hadassah, that is, Esther, his uncle’s daughter; for she had neither father nor mother....and when her father and mother were dead, Mordecai took her for his own daughter.” The Talmud asks, why does the verse state that Esther had no father or mother after it already stated that Esther was an orphan?³⁴ Rashi’s interpretation is that as soon as Esther’s mother conceived, her father died and her mother died while giving birth. Rashi then comments that fatherhood begins with fertilization, whereas motherhood begins with birth and that the act of giving birth confers the

³⁴ Interestingly, adoption in halakhah is viewed as a charitable act. Sanhedrin 19b states that whosoever rears an orphan in his own home is considered as if he fathered the child. Bathiah, the daughter of Pharoh, reared Moshe and is also called his mother (*Divrei Ha-Yamin* I 4:18) and Ruth’s child was raised by Naomi and is referred as the son of Naomi (Ruth 4:17). In addition, Rambam states that Ben Azai did not sin by never marrying because his Torah disciples were considered his offspring. Yet, according to halakhah, adoption does not constitute a natural halakhic relationship. An adopted child that either hits or curses his adoptive parents is not subject to the same severe punishments as a genetic child who engages in those activities (*Hullin* 11b).

status of motherhood. Since Esther's mother died immediately before giving birth, Esther had no halakhic mother.³⁵

- The Midrash and Targum state that Dinah was transferred as an embryo from the womb of Rachel to the womb of Leah and yet, she is referred to in the Torah as the daughter of her birth mother, Leah.³⁶ It is interesting that the Tur³⁷ uses this Midrash to arrive at the opposite conclusion, that because Dinah was allowed to marry Shimon, it must mean that the woman who conceived the child serves as the halakhic mother, since according to Biblical law a brother cannot marry his maternal sister. Many halakhic scholars, however, claim that using a Midrash as a halachic source is inappropriate as *halakhot* are not derived from *Agadot*³⁸ or from claimed miraculous events.³⁹
- *Yevamot* 69b states that an embryo less than 40 days into gestation is considered like “mere water” (*maya b'alma*) and lacks a maternal-fetal relationship. The assumption here is that conception per se does not impart a halakhic maternal-fetal relationship. Ramban⁴⁰ states that the Talmud **does not** mean that a fetus less than 40 days into gestation has not achieved humanhood. He rules that one is required to violate the Sabbath to save such a fetus. The phrase “mere water” simply represents a stage of human embryonic development when the embryo is unformed protoplasm and has no physical entity of humanhood. Thus, according to this interpretation, this discussion in the Talmud does not directly deal with the issue of who is the halakhic mother of a fetus.

Both the genetic and gestational women are halakhic mothers: As evident from the above sources, various arguments have been made that support either position—that the genetic or the gestational woman can be considered as halakhic mothers. Therefore, when there are conflicting views and sources, modern Jewish law should accommodate both possibilities and consider the genetic donor and birth woman as halakhic mothers.⁴¹ Rabbi

³⁵ Also see Rabbi Chaim Jachter, *Gray Matter 2*, Yashar Books, pp. 108, 2006.

³⁶ *Berakhot* 60a; *Targum Yonatan*, Genesis 30:21; *Yerushalmi*, *Berakhot* 9:3.

³⁷ *Tur* on Genesis 46:10.

³⁸ *Yerushalmi*, *Pe'ah* chapter 2 halakhah 5.

³⁹ Rabbi Sterenbuch, *Be-Sherilei Ha-Refuah*, Vol. 8, 5747, 1987, pp. 29–36.

⁴⁰ Ramban, *Torat Ha-Adam*, *Hilkhot Shabbat*.

⁴¹ Rabbi Zalman Nechamia Goldberg in *Ma'ayon* states that any halakhah requires a precedent as it flowed from Moshe through the masoretic chain of *poskim*. A rabbi can legislate halakhah only if a previous *posek* discussed the issue. With

Shlomo Zalman Auerbach supports the view that there are no definitive halakhic precedents that would define motherhood in the case of surrogacy.⁴² Thus, halakhah requires the child born from a non-Jewish surrogate to convert and that a *Kohen* should not marry a woman who was born from a non-Jewish surrogate even though she was conceived using an egg and sperm obtained from a Jewish couple.

Re-examining Halakhic Considerations Related to Surrogacy

There are many halakhic considerations that should be re-examined in light of the recent discoveries regarding maternal-fetal cellular exchange in pregnancy and the role of epigenetics in fetal development. Two halakhic issues require elaboration: 1) the halakhic lineage of the child born from a surrogate, 2) can a Jewish woman serve as a surrogate? Ancillary concerns include what financial compensation should be offered to the surrogate, whether there is an obligation to reveal the medical histories of all parties involved, and whether the identity of the surrogate should be revealed to the child. In addition, does financial compensation violate the current legal and moral opinion that sale of organs is illegal, lest humans become objects of commerce?

Who is the halakhic mother of the child? From a halakhic perspective, the fact that the surrogate is not merely an incubator for fetal development but significantly contributes cellular and epigenetic instructions to the fetus she is gestating must be considered in the deliberations of identifying the halakhic mother of the child. At first glance one might use this scientific information to support the view that the surrogate mother should be viewed as the halakhic mother of the child. In this sense, the gestational

regard to new emerging technologies, it becomes important to establish a precedent. If no precedent is available then halakhah must take into consideration all positions before issuing a *pesak*. Thus, the position that both the genetic and gestational women are considered halakhic mothers does not mean that the child has two mothers. Rather, halakhah follows the stringencies as if both women would be considered the halakhic mothers. The dual role of conception and gestation is alluded to in the semantics of the Torah (Numbers 11:12). When the Children of Israel were complaining about the lack of meat, Moshe became upset and said, וְלִדְתִּיהֶוּ אֵת כָּל-הָעָם הַזֶּה--אִם-אֶנֶכִי, “Have I **conceived** all these people? Have I **given birth** to them?” Why did Moshe use both terms of conception and giving birth in his statement unless they both have some legal or moral status? It should be noted that no established rabbinical authority uses this verse to support the position that both the gestational and genetic women serve as halakhic mothers.

⁴² *Nishmat Avraham* 4:186.

surrogate is not merely following the DNA instructions of the gamete donor. Both the surrogate and the egg donor significantly contribute biologically and genetically to fetal development. Since there is no universally agreed halakhic precedent to this issue of halakhic motherhood in the surrogate, the *t'shva* of Rabbi Shlomo Zalman Auerbach remains most compelling—namely that both the genetic and gestational women should be considered as the halakhic mothers of the child.

Can a Jewish Woman Serve as a Surrogate? The first recorded time that an Orthodox woman served as a surrogate mother occurred in 2009, after receiving authorization to do so from Rabbi Zalman Nehemia Goldberg.⁴³ The woman, a widowed mother from southern Israel, served as a surrogate in order to help a childless couple bring a baby into the world. The biological couple had been trying to get pregnant for 12 years and wanted their Jewish baby to develop in an “atmosphere of sanctity and purity in the womb of a Jewish surrogate mother.”⁴⁴

From an emotional and philosophical perspective, the realization that the surrogate exchanges cells with the fetus and the increased knowledge that maternal-based epigenetic factors may have pronounced effects on the health and/or personality of a child may strongly persuade an infertile Jewish couple to engage a Jewish woman to serve as a surrogate. There are, however, at least four halakhic problems related to recruiting a Jewish woman as a surrogate, especially in America where most surrogates are married women.

First, a married Jewish woman cannot serve as a surrogate since implanting an embryo generated from a Jewish man who is not her husband would fall under the laws of *ervab* (improper behavior).⁴⁵ Similarly, Jewish couples whose husbands are sterile may employ artificial insemination procedures and may even prefer using sperm from a Jewish man to im-

⁴³ <<http://www.ynetnews.com/articles/1,7340,L-3721194,00.html>>. We have not found any published reference where Rabbi Goldberg explains the halakhic basis of his decision in this case.

⁴⁴ Ibid no. 42.

⁴⁵ Artificial insemination using the semen of a Jewish donor other than the husband is considered by most rabbinic opinions to be strictly prohibited for a variety of reasons, including the possibility of adultery, incest, confused genealogy, and the problems of inheritance. See Avraham Steinberg and Fred Rosner, *Encyclopedia of Jewish Medical Ethics*, Feldheim Publishers, New York, Volume 1, pg. 58 (Artificial Insemination) and Volume II: pg. 571–585, 2003; Fred Rosner, “Artificial Insemination in Jewish Law,” *Jewish Bioethics* (Rosner and Bleich, Ed), KTAV Publishing, Hoboken, NJ, 1979.

plant “Jewish genes” into their child. However, no leading rabbinical authority allows the use of a Jewish sperm donor for a couple whose husband is sterile.⁴⁶

One aspect of the prohibition of *ervab* relates to the issue of *k'rovim*. If a Jewish woman serves as a surrogate for two or more non-related couples, then children born from the surrogate would be genetically unrelated but halakhically viewed as siblings (*k'rovim*). This may create problems for these children to marry in the future because one sibling may unknowingly marry a forbidden relative of the other sibling. In addition, a Jewish woman cannot halakhically serve as a surrogate for her own *k'rovim*. It is halakhically prohibited for a mother to serve as a surrogate for her daughter (or vice versa) or for a father to donate sperm for IVF that will generate a fetus that his daughter will gestate. Rather, the claim that a child can be conceived, via IVF, from his or her grandparent and parent violates the halakhot governing procreation.

The second issue is the prohibition of self-injury (*havala*, “wounds or injures”) and many authorities⁴⁷ state that this prohibition is a Torah-based Law. In general, the Jewish Law of self-injury has not been adequately analyzed with respect to surrogacy and there are no Jewish sources that allow deliberate infliction of physical self-injury for non-medical benefits of other individuals.⁴⁸ Jewish law condemns self-inflicted injuries,⁴⁹ with the noted exceptions being self-defense, medical treatments, fasting on *Yom Kippur*, the perforation of a Hebrew slave’s ear if he refuses to leave slavery, and the mitzvah of circumcision. In addition, a wife is permitted to get pregnant even though pregnancy is recognized by halakhah as a medical health risk to a woman.

*Shulhan Arukh*⁵⁰ phrases the law of self-injury differently than Rambam.⁵¹ “He who injures himself is free (from punishment), although it is not permitted to do so.” The reason for this ambiguous statement in the *Shulhan Arukh* is that Rabbi Akiva, the alleged author of this law, presents

⁴⁶ See Avraham Steinberg and Fred Rosner, *Encyclopedia of Jewish Medical Ethics*, Feldheim Publishers, New York, Volume 1, pp. 58 (Artificial Insemination) and Volume II: pp. 571–585, 2003; Fred Rosner, “Artificial Insemination in Jewish Law,” *Jewish Bioethics* (Rosner and Bleich, Ed), KTAV Publishing, Hoboken, NJ, 1979.

⁴⁷ See Rashba 1:647; *Tumim* 27:1.

⁴⁸ See Rabbi I Jakobovits, *Jewish Medical Ethics*, Bloch Publishing, New York pp. 97, 1977.

⁴⁹ *Hoshen Mishpat* 420:I.

⁵⁰ *Hoshen Mishpat* 420.31.

⁵¹ Rambam, *Hovel U'mazik* 5:1.

two different legal statements regarding self-injury. In the *Mishnah*, *Bava Kamma* 8.6, he states the law just as the *Shulhan Arukh* quotes it, namely, “You should not injure yourself, but if you do so, you are free from punishment.” But in a *baraita* quoted in the *Talmud* (*Bava Kamma* 91a and 92a), Rabbi Akiva says explicitly that a man is free to expose himself to possible injury for some rational gain. For example, even though construction worker or police officer will likely encounter physical injury resulting from their jobs, the financial gain from their jobs allows them to choose these professions. In contrast, a woman accepting the medical risks associated with getting pregnant without any medical benefits⁵² and for purely financial gains differs from being employed in a dangerous job. In the former situation, pregnancy is halakhically considered as a definite health risk, whereas the construction worker is engaging in activities where there is only a statistical probability that the employed might encounter health risks.

When self-injury is used as a means of curing an illness or ailment, it is not prohibited because it is considered not an injury, but rather a remedy. There are several medical-based exceptions related to *havala* stated in the *Talmud* and in *Iḥazal*. For example, the practice of bloodletting (a method of healing that was common until recent times) is mentioned in numerous places in the *Talmud*,⁵³ without any mention of the concern of causing oneself injury. This approach is consistent with Rambam who states, “It is forbidden for a person to injure both himself and others, and one who does so... in a destructive manner (דרך נציון, *derech nitḥayon*)⁵⁴ transgresses a negative commandment.”

One must therefore carefully consider the following factors in analyzing whether it is permissible for a Jewish unmarried woman to accept health risks of gestational surrogacy and engage in self-injury by serving as a surrogate, when she may not be obligated to fulfill the commandment of *p’ru u-r’vu*.

In addition to the normal medical risks of pregnancy and the birthing process, additional risks are entailed by a gestational surrogate who requires hormonal hyperstimulation and the use of invasive procedures to implant the embryo into her uterus. Hormonal treatments given to the

⁵² A potential surrogate woman is capable of getting pregnant without medical intervention but as a surrogate requires interventions that have defined medical risks.

⁵³ See *Gittin* 70a as an example.

⁵⁴ Rambam, *Hoval U’mazik* 5:1—“in a striking manner,” a manner that displays subjectivity over the individual.

surrogate are associated with short-term risks such as ectopic pregnancies, increased risks of miscarriage, and premature delivery of the fetus. Long-term risks include an increased risk of breast, ovarian, and endometrial cancers.⁵⁵ All these medical risks are more frequent in, or unique to, surrogacy than observed in normal pregnancies.

Before continuing to explore the issue of whether a Jewish woman can serve as a surrogate, it is necessary to ask how is it halakhically permissible for a wife to become pregnant and subject herself to self-injury when she is not commanded to engage in the mitzvah of *p'ru u-r'vu*?⁵⁶ There are several responses to this question. First, the issue of whether a woman is commanded to fulfill this mitzvah is a dispute in the Mishnah.⁵⁷ Halakhic authorities such as *Tosafot* believe that a wife and her husband fulfill another mitzvah “to populate the world.”⁵⁸ Second, even if a wife is not mandated to fulfill *p'ru u-r'vu*, she voluntarily performs a mitzvah as part of the prescribed divine directive to procreate.⁵⁹ Some halakhic scholars even propose that a wife is included in the mitzvah of *p'ru u-r'vu* (Rabbi

⁵⁵ <<http://www.eshre.eu/page.aspx/1507>>; <<http://www.webmd.com/infertility-and-reproduction/news/20111027/ivf-may-raise-risk-for-less-aggressive-ovarian-cancer>>.

⁵⁶ The reason presented by Rabbi Illa in the name of Rabbi Elazar bar Shimon for the exclusion of women from this mitzvah is based on the analysis of the word *kinshu'ha*, you shall conquer it, that is found in Genesis 1:28. It is the way of man to conquer but it is not the way of woman to conquer (*Yevamot* 55b and 65b).

⁵⁷ R. Yochanan b. B'rokah in the *Mishnah (65b)* disputes the majority ruling that women are exempt and claims that women are indeed equally obligated. “*Al sh'neibem Hu"omeir ... p'ru u-r'vu*”—the plural of “*p'ru u-r'vu*” indicates that God is addressing both man and woman.

⁵⁸ *Yevamot* 62a-62b and *Gittin* 41b allude to Isaiah 45:18 that states, “He did not create (the world) to be desolate but rather to be populated.” *Tosafot (Gittin* 41b and 45b) state that a woman is obligated to populate the world. It is important to note that Rambam does not quote the verse from Isaiah regarding the mitzvah of populating the world.

⁵⁹ The Talmud (*Kiddushin* 41a) mentions the mitzvah for a woman to marry. Rambam (*Hilkhot Ishut 1:1*) introduces the mitzvah of *p'ru u-r'vu* within the laws of marriage. *Tosafot* in *Yevamot* 65b and *Ha'amek Davar* in Genesis 35:11 understood the plural language of Genesis 1:28 to mean that procreation is a blessing for both husband and wife but a commandment only for the man. Several commentaries raise the question as to why a wife has a mitzvah to marry if she has no obligation to procreate. Rabbeinu Nissim suggests that although she is not obligated, her participation is considered a mitzvah because of her essential role. The responsa of the Ran #32 states that while procreation for a woman is optional and not obligatory, the commandment for a woman is to assist her husband in the mitzvah of procreation. Rabbi Meir Simḥah ha-Kohen of Dvinsk

Nissim (#27); Meiri (*Kiddushin* 41b). Finally, halakhah dictates that creating children requires the establishment of a marital community (husband, wife, and God, *Niddah* 31), where both husband and wife take on the responsibilities of caring for and educating a child.⁶⁰

In contrast to a wife, a Jewish woman who engages in gestational surrogacy is not getting pregnant to fulfill her directive to engage in the mitzvah of *p'ru u-rvu*.⁶¹ She is also not producing children through marital relations, she does not create a marital community, and she is not taking on the responsibilities of childcare and child education.

A third reason that a surrogate should not be Jewish is the potential risk of infidelity between the surrogate woman and the genetic father. This concern has scientific support from a study presented by Dr. Nancy Reames of Columbia University in 1999 on the outcomes of psychological dissatisfaction expressed by actual surrogates.⁶² She interviewed various women who were unsatisfied with their surrogate birth experience. Their dissatisfaction arose from the following issues: a) lack of support from relatives or spouse, b) ambivalence about the compensation fee, c) the balance of “shared governance” of the pregnancy, d) limited contact with the infertile wife, e) broken promises by the couple, and e) unintended life events associated with surrogacy.

Unintended life events included sexual relationships of the surrogate with the contracting genetic father that at times even led to the divorce of the biological parents. These illicit sexual behaviors probably resulted from strong emotional bonds that can develop between the genetic father and the surrogate who is carrying his biological child. Thus, from a halakhic perspective, there is the potential risk of an emotional bond developing between the surrogate and the genetic husband/father that could lead the husband to engage in illegal relations with a Jewish surrogate.

explains that the Torah does not impose upon an individual a commandment that incurs medical risks (*Meshekh Hakbamab*, Genesis 9:7). Rabbi Meir Simcha Ha-Kohen also points out that Adam and Hava indeed were *both* obligated in the mitzvah since the commandment was issued before they sinned and incurred the punishment of pain in pregnancy and childbirth.

⁶⁰ Rabbi Joseph Dov Soloveitchik, *Family Redeemed*, KTAV Publishing House, 2002, pp. 31–72. See Rosh (*Ketubot* 1:12) who states that the proper way to fulfill the mitzvah to procreate is to first get married.

⁶¹ Note that the genetic father can fulfill the mitzvah of *p'ru u-rvu* with a Jewish or non-Jewish surrogate woman.

⁶² 1999 National Conference on Reproductive Outcomes, Ann Arbor, MI and <<http://www.nytimes.com/1998/10/20/science/surrogate-mothers-report-few-regrets.html?scp=1&sq=Nancy%20Reame&st=cse>>; Personal communication with Dr. Nancy Reames.

In summary, the various reasons (laws of *ervah*, the possibility of producing non-genetic *k'rovim*, the prohibition of self-injury, and the potential risk of infidelity between the genetic father and the surrogate) may be sufficient halakhic grounds to discourage or even prohibit infertile couples from procuring a Jewish woman as their surrogate.

Other Halakhic Issues Related to Surrogacy

Financial Compensation: From a halakhic perspective, efforts should be taken to ensure that surrogacy arrangements and contracts state that the prospective parents must compensate the surrogate mother fairly and appropriately for her expenses, e.g., costs of IVF, pregnancy, delivery (if not covered by health insurance), adoption procedures, insurance, and legal fees. Postpartum financial considerations need to be addressed in the informed consent process and in the contractual agreement as well. Who, for example, will be financially responsible if the surrogate develops postpartum depression or other psychological or medical sequelae resulting from pregnancy or the birth process? Who will cover future medical expenses from diseases, such as cancer or autoimmune diseases that may result from fetal cells that transferred from the surrogate to the fetus or maternal cells that transferred from the fetus to the surrogate?

Revealing Medical Information: autonomy and the right to know: The prospective parents (gamete donors) and surrogate should recognize that for nine months, the fetus should be viewed as an implanted integral functioning organ that shares and exchanges numerous physiological processes. In addition, all parties should be advised that ideally they should share medical and psychological health information before the surrogacy arrangement has been agreed upon and well beyond the delivery of the child. Thus, all available health-related information should be provided to all parties so they can decide whether and how to proceed with the surrogacy arrangement. Additionally, the surrogate contract should address who covers future health problems that may arise in either the surrogate or fetus resulting from maternal-fetal cell exchange or epigenetics.

Anonymity: Anonymity creates a serious halakhic concern because a child born from the surrogate is prohibited from marrying a close relative of the genetic mother or of the surrogate (especially if the surrogate is Jewish). Currently the Israeli Government is considering establishing a computer-based registry for sperm donors, egg donors, and surrogates that will collect all the relevant information to ensure that siblings do not marry each other. Computer technology provides a viable method to protect anonymity and allows a couple considering marriage in Israel to provide birth information to their rabbi to ensure that the members of the

couple are not halakhic siblings. Once a child born via IVF reaches 18, he or she may gain access to their genetic or host mother's information (if she agrees) and the computer can generate the appropriate information. If the surrogate does not want to reveal that information it would be so indicated in the database.

Conclusions

The fact that maternal-fetal cell exchange takes place in normal pregnancies is consistent with the few studies that it occurs in surrogacy as well. This information, coupled with our emerging understanding of how environmental factors impact the health of the fetus, via epigenetics, indicates that the surrogate is more than merely an incubator for fetal development. Rather, she plays a critical role in fetal development and in the future behavioral and physiological health of the child.

Despite the biological, epigenetic, and psychological contributions of the pregnant woman to the fetus, there are compelling reasons that a Jewish woman may not serve as a surrogate for an infertile Jewish couple. We therefore propose the following scenario to avoid as many halakhic issues as possible and to allow surrogacy to become a viable therapeutic alternative for infertile couples. Every aspect of ART requires consultation with a rabbi who has studied the complex halakhot and medical/biological facts. We suggest that the gestational surrogate be non-Jewish and that the child should undergo conversion after birth. Anonymity of the surrogacy should be implemented in a computer-based registry. Finally, when the child born from the surrogate is ready to marry, he or she should undergo genetic testing with the prospective spouse to ensure that they are not genetically related. Adopting this paradigm may avoid potential halakhic problems and protects all parties involved in this therapeutic process and allows the dreams of the infertile couple to be fulfilled. 