Cryobanking of human sperm

Mark S Frankel1 Program of Policy Studies in Science and Technology, George Washington University, Washington, DC, USA

This brief essay discusses some of the medical and social uses of banking human semen as well as many of the ethical issues which emerge from the application of this technology.

In 1953, Bunge and Sherman, using dry ice for freezing and storing semen, reported the first successful human pregnancy resulting from insemination with frozen human semen. Since that time, new and improved methods of freezing and storing semen by immersion in liquid nitrogen at −196.5°C (Behrman and Ackerman, 1969) have improved the fertilizing capacity of frozen semen and led to the emergence of a number of commercial human sperm banks in the United States.

Contemporary uses

The primary use of frozen semen has been for the treatment of male infertility, in which case a 'donor's' semen may be used for insemination independently of time and place. An increase in demand for semen by infertile couples, who represent about 30 per cent of all marriages in the United States, was a contributing factor to the rapid growth of commercial semen banking. Another factor was the increasing popularity of vasectomy as a method of contraception. With the hope of freezing their semen for use at a later time, many men viewed semen banks as a way of ensuring future fertility.

As a medical procedure, human semen banking must be considered an experimental technique and this has led to publicly expressed caution against its widespread use. For example, the American Public Health Association has questioned the 'biologic potency and genetic adequacy' of human sperm frozen over a relatively long period of time. Moreover, the National Medical Committee of Planned Parenthood - World Population has argued that any promise of fertility 'insurance' by freezing and storing semen may mislead and persuade individuals to undergo vasectomy in a hasty manner without proper consideration of the consequences. This publicly expressed concern underscores the need to review the rapid growth of human semen banks and to ensure that individual and society's interests, however they may eventually be defined, are adequately protected.

Informed consent

The increasing availability of frozen semen for therapeutic and contraceptive purposes raises several ethical questions regarding the use of, and requirements for, informed consent. To protect the rights and welfare of all parties using frozen semen, a consent agreement should be implemented. Yet, a survey of American semen banks found no standard procedures for obtaining the consent of either recipients or donors.

Properly executed consent becomes an issue in human semen banking as it applies to: 1) the process of collecting, storing, and using semen for therapeutic purposes; 2) the use of semen banking as a method of population control; and 3) frozen semen for scientific research.

The emotional and social impact often accompanying therapeutic (donor) insemination requires that prospective recipients be told of possible psychological reactions (Rubin, 1965). Recipients should be informed that there is no guarantee that pregnancy will result from the use of semen that has been frozen and stored over a protracted period of time. Since infertile couples will be anxious to consent to any procedure which promises them the slightest hope of conception, they will be particularly vulnerable to exploitation and it would be unethical to take advantage of their desperation by creating false expectations. A recent report (Fiunara, 1972) of the transmission of gonorrhoea by artificial insemination and the possible transmission of genetic diseases raises additional problems. Some workers in charge of semen banks perform genetic screening tests and chromosome analyses as routine procedures; others rely on the more easily obtained medical and genetic histories. Since a donor may not know that he is a carrier of a transmissible disease, should there be a requirement that consent forms enumerate the specific medical tests that will be performed to determine the health of the donor and the quality of his semen? Is the recipient entitled to a genetic profile of the donor? If so, are there certain genetic tests which should be required? By what criteria are these tests to be selected? The

1Present address: Department of Political Science, Wayne State University, Detroit, Michigan 48202, USA
Cryobanking of human sperm

mattering of genetic testing is complicated further by
the fact that the majority of genetic diseases cannot
yet be detected by screening tests. How, then, can
society maximize the safety and well-being of the
recipients and their potential offspring?
Since the hope of future fertility by semen
cryopreservation may encourage some men to
submit to vasectomy as a means of population
control, there is the danger of exploiting these hopes
among those least prepared psychologically to
understand the implications of their act. For
example, there is evidence which suggests that
vasectomies are not always benign and may increase
sexual and psychological difficulties among those
not emotionally prepared for the operation (Wolfers,
1970). While proper counselling may eliminate some
of these individuals, it is essential that all men (and
their wives) be fully informed of the scientific
knowledge regarding frozen semen banking, includ-
ing a statement that there is at present no way of
ensuring that their semen will maintain its fertilizing
capacity following frozen storage.
Many workers with semen banks are using stored
semen to conduct fertility research. This may lead
to a conflict of interest for an investigator involved
in such research who, at the same time, counsels
his patients on the therapeutic/contraceptive bene-
fits of banking semen. There have been instances in
other fields of biomedical research where an overly
ambitious investigator, in promoting his own
scientific career, has failed to consider properly the
best interests of his patients (Barber et al, 1973). It
is imperative, therefore, that those planning to store
their semen be informed of any research for which
that semen may be used and its possible conse-
quences. If it is to be used for other research
additional consent should be obtained. For example,
the at least one commercial bank has suggested that
semen be used for research relating to fertilization
in vitro, the fertilization outside the body of the
female of human egg by human sperm, and a
procedure which raises a host of its own ethical
and social issues (Ramsey, 1972). Yet, it is doubtful
whether persons depositing their semen are made
aware of this possibility by existing storage agree-
ments or consent forms.

Donor compensation

Commercial semen banks rely primarily on paid
donors and this commercialization of semen
donations creates both ethical and biological
problems. If semen is treated in practice as a
commodity to be bought and sold, what will be
the impact on prospective donors of blood, eyes, or
vital organs? Will they simply be viewed as other
disposable 'commodities' in the market place?
Competition between semen banks may also lead to
a search for the 'best' donors. To what extent, then,
will the buying and selling price of frozen semen
determine the quality of the product and its conse-
quences for the recipient? Will this eventually lead
to the day when a semen bank promises 'eugenically
desirable semen' to the highest bidder? Furthermore,
will remuneration be viewed by the donor as a sign
that he no longer need be concerned with the
consequences of his act? For example, will donors
frequently sell their semen in order to maintain an
already illicit drug habit? There is always the
dreaded possibility that a person who continuously
sells his semen to supplement his income may well
have a history of taking drugs and be unlikely to
acknowledge it. In any newly developing field of
medical care such as human semen banking, there
is bound to be a high level of ignorance and un-
certainty on the part of consumers. The patient
often has no choice but to trust the medical profes-
sion as well as others who provide his medical care.
Furthermore, the patient establishes this fiduciary
relationship knowing that he and his family may
have to bear the biological, social, and economic
consequences that may result from any misplaced
trust. Commercial semen banking raises serious
ethical questions regarding the trust between
doctor and patient and the responsibilities of the
physician and the commercial bank to the consumer.

Commercial banks and some broader social
issues

The development of commercial semen banks also
raises a host of broader ethical and social issues. For
example, to what extent should a society which is
already investing in ways to curb population
growth simultaneously support an effort which
would help infertile couples to have children? Should
limits be placed on the number of children that
could be conceived in this manner?
If techniques for identifying and separating
female- and male-producing sperm can be developed,
frozen semen banking would make it easier for
couples to use artificial insemination for choosing
the sex of their children (one can easily visualize
a clever entrepreneur opening up a semen bank for
this purpose). But should semen banking be used
for such socially orientated purposes? The issue
involves more than medical considerations. For
example, would the free use of sex preselection
techniques lead to an imbalanced sex ratio and an
altering of birth order patterns, both of which may
generate serious social and behavioural effects
(Etzioni, 1968; Handler, 1970)? There is also the
serious ethical question of the propriety of distribut-
ing basically inessential but highly valued medical
resources.

By carefully selecting donors with regard to their
genetic qualities, the storage of frozen semen could
make available a wide range of genetic material for
altering the genetic quality of the human species
(Muller, 1961). This raises the question of how and
by whom the determination should be made of those human qualities to be considered 'desirable', especially with regard to future generations which will live in different physical and social environments. What ethical responsibilities exist between generations in the context of this technological capability?

Specimens of semen from different donors also vary considerably in their ability to withstand the process of freezing, storing, and thawing. Thus, it is highly probable that some donors will father a greater proportion of progeny than would normally be expected with regard to their history of fertility. This disproportionate use of donors will increase the coefficient of inbreeding and could result in an increased incidence of recessive genetic diseases. For example, marriage between first cousins brings together one eighth of the total recessive genes carried by both individuals, and studies have demonstrated that the progeny of such marriages experience a higher-than-normal mortality and malformation rate (McLaren, 1973).

The potential use of semen bank technology for such social purposes creates biological and social consequences for a broad spectrum of society and poses serious ethical issues. With the sudden emergence of commercial semen banks, it is not too soon to begin to consider how society can best use this technological capability to serve truly human ends.

References


Cryobanking of human sperm

Mark S Frankel

*J Med Ethics* 1975 1: 36-38
doi: 10.1136/jme.1.1.36

Updated information and services can be found at:
http://jme.bmj.com/content/1/1/36

**Email alerting service**

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

**Notes**

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/