

High-Tech Medical Ethics

By Hisashi Matsumoto

A medical team at Keio University in Tokyo has succeeded, for the first time in the world, in the clinical application of a "sex selection" method which does not depend on in vitro fertilization. It can ensure the birth of a baby girl with close to 100% reliability.

The news of this success created a sensation overseas and drew a flood of inquiries from abroad. In Japan, controversy exploded over the ethical issues involved. The Ethics Committee of Keio University took the stand that sex selection should be applied only when there would be a danger of hereditary disease if the baby were male. The committee maintains that the method should not be authorized for use in the case of ordinary couples, and at present, the view that the sex of babies should not depend on the whim of the parents has prevailed. Yet at the same time, the desire to select one's baby's sex runs deep among many people.

The sex selection debate has only capped a growing wave of concern over the advent of ever more advanced medical technology. In vitro fertilization, prenatal disease diagnoses and heart transplants using organs from victims declared brain dead are having a shattering impact on the Japanese people's ethical world view. The shock waves are as great as those felt by feudal Japan when Commodore Perry's black ships forced the country to open its doors to the rest of the world in the mid-19th century.

Of the many recent medical breakthroughs, few have caused such a sensation as Keio's sex assignment technique. The sex of a child is determined by a combination of X- and Y-chromosomes. The father produces both X-spermatozoa

carrying the X-chromosome and Y-spermatozoa carrying the Y-chromosome, while the mother produces an ovum that always has an X-chromosome. When an X-sperm combines with the ovum, the X-X combination results in a baby girl. When a Y-sperm combines with the ovum, a baby boy is born. Sex selection, therefore, is possible if the chromosome of the spermatozoon that combines with the ovum can be controlled in advance.

The sex selection method developed by the Keio University team headed by Professor Rihachi Iizuka works in the following way. Sperm taken from the husband is placed in a test tube containing a special solution called Percoll. Then the test tube is placed in a centrifugal separator for about 20 minutes at a speed of about 2,000 revolutions per minute. The

X-spermatozoa, which are heavier than Y-spermatozoa, sink to the bottom. The purity of the X-sperm suspended in the Percoll solution can be raised to a maximum of 98% without damage. If the wife is artificially inseminated with the highly concentrated X-sperm, the chances of a boy being born are infinitesimal, and indeed, six women on whom the technique was tried all gave birth to girls. But Iizuka says that a way has yet to be found to raise the purity of the Y-sperm separated by the centrifuge, and it will be some time before male births can be ensured.

Apart from the Keio medical team itself, the Sex Selection (SS) Study Group, headed by Shiro Sugiyama and made up of about 800 practicing obstetricians and gynecologists, has also used the Keio method in some 50 pregnancies.



Keio University hospital in Tokyo where a medical team recently succeeded in the clinical application of a "sex selection" method, the first such success to date

Controversy flares up

No sooner was the sex selection news reported at the end of May than a debate erupted over the pros and cons. The Japanese people have long preferred to let nature take its course as much as possible. Reflecting this mentality, a prominent female social commentator lamented, "We should leave it entirely to nature to determine the sex of the baby to be born. Science cannot control every aspect of life, and sex selection is a God-defying act. Man should not venture into a realm which he should never transgress...."

On the other hand, there are many couples who desperately want a daughter. According to the SS Study Group, application of the sex selection technique was to avoid the possible transmission of a hereditary disease or to cure infertility in about half of all cases. The remaining half requested the technique for personal or family reasons. Of these, the majority of couples wanted a daughter because they already had four or five sons. One mother wished to have a baby girl to take the place of a daughter who had died, while a ballerina wanted a daughter to follow in her footsteps. One woman had even become suicidal because of her husband's insistence that she give birth to a girl.

Concerned about the public uproar, the Keio Medical School convened its Ethics Committee and decided on a general policy "to limit the application of the sex selection method to the purely medical purpose of preventing hereditary diseases and not simply to accommodate parental desire to have a daughter."

The Japan Society of Obstetrics and Gynecology, composed of research scholars, and the Japan Medical Association, formed by general practitioners, are now

studying the sex selection issue and intend to clarify their stands at an early date. The SS Study Group, meanwhile, temporarily suspended its use of the sex selection method pending the formation of a public consensus. However, President Sugiyama has revealed that he himself had used the technique at the urgent request of a few couples even after the temporary ban. Because sex selection does not endanger the life of the mother, in the absence of legal restrictions there is likely to be a growing gap between *tatema* (principles) and *honno* (true intentions), which is often the case in Japanese society.

In vitro fertilization

In vitro fertilization is another technique that artificially controls the origin of life. The problem of in vitro fertilization is all the more complicated because it can involve a third party, namely, a surrogate mother who lends her womb to an infertile woman.

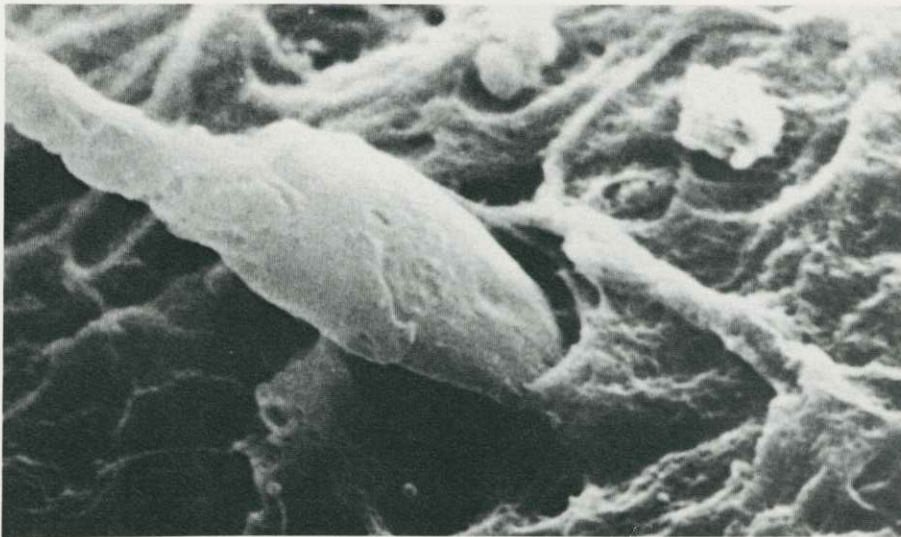
In Australia and the United States, there have already been many instances in which a woman's ovum was fertilized in a test tube by her husband's sperm, and then implanted in another woman's uterus for gestation and birth. In vitro fertilization experiments using frozen fertilized ova and frozen ova are being conducted overseas to make it possible for a child to be born 100 years after its parents have died. Clearly, the tolerated level of such manipulation of life differs from country to country.

Japan's attitude toward in vitro fertilization is markedly different from that in many other countries. In line with their basic dislike of the unnatural, the Japanese limit in vitro fertilization to legally married couples. At present a surrogate mother is unthinkable in Japan.

The first test-tube baby in Japan was born in October 1983 in the Medical Department hospital of Tohoku University in Sendai. It was a banner headline story in the newspapers, and the public reaction to in vitro fertilization itself was favorable. Many women who already had children doubtless must have thought, as was reported at the time, that "it isn't worth going to that much trouble to have a child." But what criticism there was was not strong. Rather, most Japanese regarded the birth of Japan's first test-tube baby as a triumph of modern medicine, and as a ray of hope for childless couples. But questions were soon being raised. One concerned privacy. The disclosure of the name of the first test-tube baby's mother by some newspapers touched off a frenzied competition among the mass media, from TV to women's weekly magazines, to get the story, despite the family's express wish to be left alone. The couple were pushed to the edge of a nervous breakdown, and Professor Masakuni Suzuki, then the head of the Medical Department who had promised the couple complete anonymity, was profoundly depressed. Nonetheless, the use of in vitro fertilization quickly picked up as the furor died down. To date, nearly 30 test-tube babies have been born in Japan, and this July the nation's first hospital specializing in the technique opened in the suburbs of Sendai.

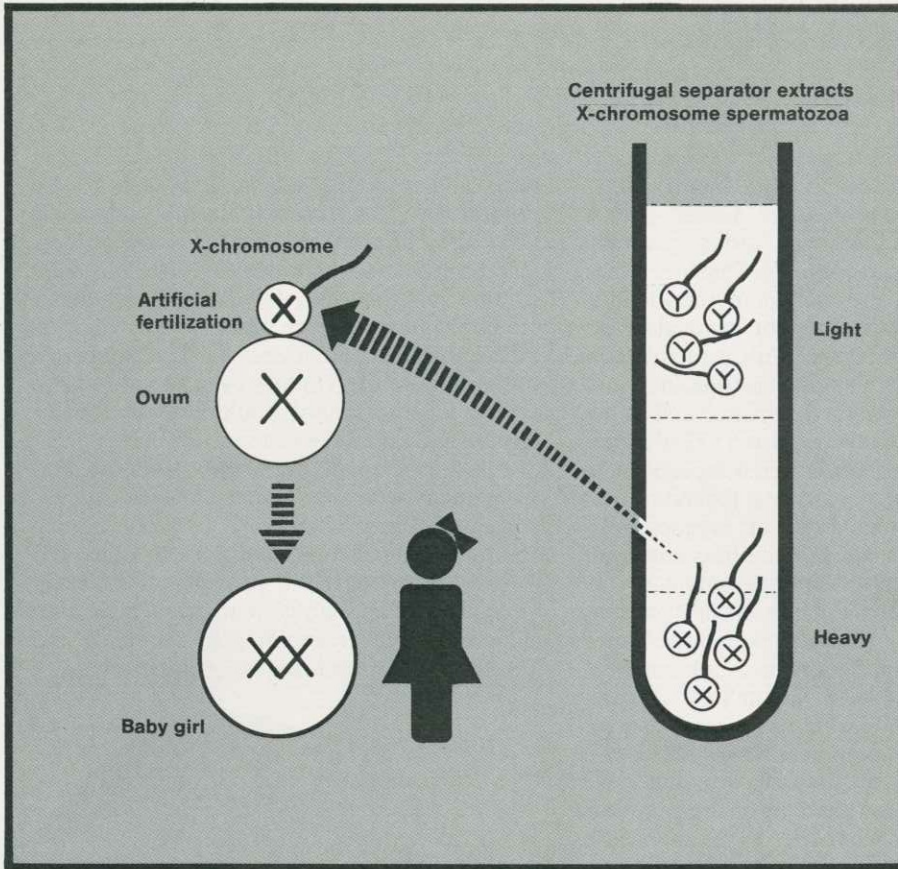
A second problem was how far doctors should be allowed to go in applying the new technique. Voices warning against unlimited application have been strong, and the Japan Society of Obstetrics and Gynecology has clearly laid down the rule that "in vitro fertilization will be strictly limited to married couples and surrogate mothers will not be tolerated." The society instituted a registration system making it mandatory for the doctor in charge to report both his own name and the names of technical assistants handling the ova and sperm, the name of the medical establishment where the fertilization was performed and the purpose of the operation.

But a more profound question posed by in vitro fertilization was that of "when and where does life begin?" It is a question most people rarely bother themselves about. After long discussion, the Japan Society of Obstetrics and Gynecology concluded that, "Life begins two weeks after fertilization." This conclusion is the same as the view held by the British Medical Society. Not all doctors agree, however. Some Japanese intellectuals and religious believers who feel that life dwells in everything present in nature in-



Enlarged view of a spermatozoon fertilizing an ovum in artificial insemination

Sex Selection Method for Ensuring the Birth of a Girl



sist that life is present even in the ovum and sperm. It is not right, they maintain, to artificially manipulate the source of life so facilely, even if is technologically possible to do so. On the other hand, Japanese law permits women to have abortions up to the third month of pregnancy if there is a justifiable reason. The existence of this law makes the debate over when life begins even more complicated.

The transplanted heart

Organ transplant surgeons unanimously agree that Japan is an "undeveloped country" as far as organ transplants are concerned. Only kidney and cornea transplants are performed in Japan at present, while bone marrow transplants are still in the experimental stage. There are none of the heart, liver and pancreas transplants now common in Europe and America. Japan's first heart transplant, the 30th in the world, was performed 18 years ago by Professor Juro Wada of Sapporo Medical College. Immediately afterwards, a liver transplant was performed at Chiba University. The liver transplant ended in failure, while the controversy over heart transplant developed into a question of homicide, turning

on the question of determination of the death in the heart donor and the suitability of the recipient. The outcome of the debate was that transplants of organs from people declared brain dead have become completely taboo.

Some researchers, however, have continued conducting transplant experiments with animals. Three years ago, the Japan Heart Transplant Research Society was inaugurated to prepare for the resumption of heart transplant operations in Japan. At the same time, fierce debate developed over the definition of death. The confirmation of brain death is a prerequisite for a heart transplant, and there are few questions more controversial.

Debate has focused on whether it is really possible to tell beyond a doubt that the brain is dead, and whether a person may be pronounced dead while his heart is still functioning. No conclusion has been reached on these questions. A tug-of-war is going on between transplant surgeons who argue that all the technical problems involved in heart transplants have been surmounted and who are eager to begin, and intellectuals who are leery about the concept of brain death. Both sides are willing to compromise if a national consensus can be obtained. But the way to

achieve consensus has not been found.

Europeans and Americans, though steeped in humanism, take the rational view that a dead human body is simply a material object. The Japanese, for their part, value "the heart where dwells the soul," and regard the body of a dead person with deep respect. Japanese find it far harder to accept the idea of donating organs after death. Kidney transplants, for instance, are legal in Japan, and the Kidney Transplant Popularization Society has introduced a donor card and is actively asking people to donate their kidneys. But the results have been disappointing. The society says at least one million card holders are needed, but so far only 100,000 have volunteered. In most kidney transplants in Japan, the needed kidney is donated by a patient's parent, brother or sister, who agree to part with one of their own healthy kidneys.

According to a survey by the Prime Minister's Office at the end of last year, 46% of 10,000 adult Japanese questioned opposed transplants using organs from persons declared brain dead, while 30% were in favor and 24% were undecided. By age group, the majority of respondents in all age groups over 30 expressed opposition, and the older the group, the stronger the opposition. In contrast, the younger generation seemed more in favor of organ transplants.

Asked what they would do if they were told by doctors that they would die without a heart or liver transplant, 42% replied that they would have the transplant, while an equal 42% replied they would not wish to go on living to that extent.

The Ministry of Health and Welfare last year established what is said to be a 100% accurate standard for determining brain death, with a view to paving the way for more organ transplants. Politicians, too, are considering enacting a law on brain death. Overall, the national mood appears to be moving toward the resumption of heart transplants.

But it is also true that there are many who still vigorously oppose any such move. For the moment, people's attention is focused on the question of when the ethics committees of the National Circulatory Organ Disease Center, the Medical School of Osaka University and Tokyo Women's Medical University, all of which are making preparations for heart transplants, will give the go-ahead. At present, it is believed that heart transplants could be resumed as early as late this year, or sometime next year at the latest.