CURRENT DEVELOPMENTS AND ISSUES: A SUMMARY

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IN VITRO FERTILIZATION

Experimental use of sperm microinjection causes uproar in Australia

IVF scientists in Victoria, Australia argued in 1986 that research on human embryos must be legally permitted because such research was essential to ensure the safety of a new egg fertilization technique. Such a technique – microinjection of a single sperm into an egg – could not be used ethically in humans without that prior research, they argued. Subsequently, legislation was passed permitting the embryo research they argued was vital. But before the legislation could be proclaimed, the IVF scientists went ahead and used the technique in women, omitting the "essential" embryo research.

A public row ensued. The Australian Minister of Health ordered *in vitro* fertilization scientists to stop using the microinjection technique in humans.

The technique had been used without the knowledge of the standing review and advisory committee on infertility, a parliamentary committee appointed in 1985 to advise on infertility and its treatment.

The microinjection technique, designed to fertilize an egg by injecting a single sperm under the outer shell of the human egg, was used clinically in March 1988 by the Monash University Medical team. The attempt was unsuccessful. No embryos were produced for implantation.

Microinjection has been used successfully only in mice. Michael Pirrie reports in *The Age:* "The [advisory] committee learnt indirectly that microinjection work had begun after doubts were raised within the Monash Medical Centre about the technique and the possibility of human embryo-related research" (April 2).

Back in 1986, IVF scientists at what is now Monash Medical Centre, had argued that they wanted Victoria's infertility legislation, banning the making of human embryos solely for research, changed to enable assessment of the safety of microinjection before using it with humans.

That year, they approached the advisory committee seeking approval to screen microinjected embryos for genetic abnormalities. The screening would destroy the embryos.

After the committee could not decide its legislative right to approve such experiments, amendments were drawn up to the Infertility (Medical Procedures) Act.

The amendments, allowing scientists to experiment on human embryos up to 22 hours after fertilisation, passed in Parliament last year but were not scheduled for proclamation until July 1 (Croggon, April 11).

In April of this year, the committee was "surprised and disconcerted" to learn of plans to use the experimental technique on humans, chairman Louis Waller told *The Age*'s Sonya Voumard. He said there had been a "breakdown of communications" between the scientists and the committee (Voumard, April 4).

In *The Age*, Pirrie commented on the row: "... the decision to use the technique clinically marks a dramatic shift in the attitude of IVF researchers. Previously, they had argued that it would be necessary to test for chromosomal defects in human embryos before using microinjection with humans" (April 12).

The ethics committee at Epworth Hospital, where most clinical IVF procedures are done, had approved the technique under certain conditions. Pirrie reports that according to a source close to the ethics committee, it strongly recommended that patients seeking IVF donate fertilized eggs or early embryos to test for abnormalities.

Pirrie wrote: "Professor Wood said that, although the Epworth ethics committee approved microinjection and human embryo experimentation if couples were willing to donate their genetic material, scientists decided not to experiment on embryos as it was part of the infertility committee's domain and the law banning embryo research had not been changed" (Pirrie, April 2).

"Under the Infertility (Medical Procedures) Act, yet to be proclaimed, new experimental procedures must be approved by the standing review and advisory committee," Pirrie wrote. "The committee, having granted approval, must report to the Health Minister, who then informs Parliament. Similarly, medical institutions wishing to carry out new IVF procedures must get the minister's approval" (Pirrie, April 2).

Victoria's shadow attorney-general, Bruce Chamerlain, commented on the clinical experiments: "I am appalled to think that they [the scientists] would take it on themselves to assume they had the right to do it when clearly they felt earlier on that it needed an act of Parliament to do so" (Voumard, April 4).

IVF pioneer Dr. Alan Trounson defended the clinical use of the experimental technique. "It's a surprise to us that this technique is of interest to the committee."

He added: "When it came to the clinic's decision to go ahead with the technique with the ethics committee's approval, we would not have thought that (the procedure) was under the auspices of the legislation" (Lee, April 6).

The Minister of Health told the scientists to stop using the technique until legislation to control its use can be proclaimed.

A scientist associated with the project said that meant five more women due to receive micro-injected eggs would not be able to. He said the women "were really going through a bit of a clinical trial."

He added: "In some ways, I suppose, each patient is sort of experimental . . . because there is no other way of getting material to work with, apart from getting the eggs and actually doing the procedure with the patient" (Pirrie, April 2).

The scientists' decision to begin experimental work on humans with the microinjection technique comes at a critical time in Australian IVF research, Pirrie notes.

"For the first time it has been shown that babies conceived in the laboratory have a much higher rate of certain birth defects than babies born by other means."

This is a blow to Melbourne's IVF scientists, he added. "They had hoped that laboratory conception would give them more control over the birth process, so that IVF children should have fewer defects" (Pirrie, April 12).

IVF scientist Carl Wood said the mouse studies showed that normal fetuses could be born from microinjection. The technique could be used in humans, he said, because most abnormal embryos formed by microinjection would spontaneously abort after being placed inside women's bodies, and the few that might continue could be detected by ultrasound and aborted medically.

One scientist close to the microinjection project told Pirrie that "in a lot of cases" genetic damage to the fetus would not be known until birth. He added: "And in some cases diseases don't show up until well after birth" (Pirrie, April 12).

Social psychologist Dr. Robyn Rowland told *The Age*'s Sonya Voumard that the new technique was a further example of "IVF turning women into living laboratories."

"I think this is the perfect example because everybody's so obsessed about not doing any harm to the embryo and nobody's concerned about the fact women's bodies are being used to test whether micro-injection works" (Voumard, April 4).

In a letter to *The Age,* Dr. Renate Klein, post-doctoral research fellow at Deakin University, wrote: 'The newly debated variety of IVF confirms what feminists have been warning about over the past four years: first, that the IVF procedure amounts to experimentation on women's bodies; second, notwithstanding the existence of ethics committees, IVF researchers will take their research wherever they want it to go next."

Commenting on a recent *Age* article, she continued: "The article omits that 'the uterus of a patient' belongs to perfectly healthy, normally functioning women whose male partners have a fertility problem." (Microinjection is designed to help men with poor quality sperm.)

"They are first submitted to dangerous hormonal stimulation to produce mature eggs, despite medical evidence that superovulation may cause cysts, ruptured ovaries and even cancer. Then they are used as living incubators to see whether the man-made embryo develops properly

in their womb. As women who submit to the physical and emotional trauma of IVF are already pushed to the limit, Professor Carl Wood's comment that abnormalities of the embryos could be followed by ultrasound and abortion, are outrageously insensitive, to say the least.

"Also many abnormalities will only be detected at birth or later. Only by putting an embryo into a woman's womb who then carries it to term, gives birth to it and watches the child's development, will anyone know if the techniques 'worked.' The general public should realise that no matter how many committees are set up – and even if their recommendations were abided by – IVF is not a treatment but remains dangerous experimentation on healthy women ..."

FIONA CROGGON. 1988, April 11. 'All we want is a child. We don't want to be part of a political game.' *The Herald*; RENATE KLEIN. 1988, April 9. Healthy women are victims of IVF fiddling. *The Age*; SANDRA LEE. 1988, April 6. Scientist defends new IVF technique. *The Herald.* MICHAEL PIRRIE. 1988, April 2. New IVF treatment stopped. *The Age*; MICHAEL PIRRIE. 1988, April 12. Decision time for IVF. *The Age*; SONYA VOUMARD. 1988, April 4. Surprise at move to apply IVF technique. *The Age.*

Injecting a single spermatozoa can produce fertilization, researchers say

Single spermatozoa can be inserted into human eggs and result in a high rate of fertilization, according to Andrea Laws-King, PhD. and her associates at Monash University Faculty of Medicine, Melbourne, Australia.

The researchers induced capacitation of spermatozoa by exposing them to a calcium-depleted medium containing strontium chloride and then resuspending them in a medium containing calcium. Then, using micromanipulation, single spermatozoa were injected under the zona pellucida of mature eggs.

Five of seven eggs manipulated within nine hours of aspiration from the follicle were fertilized. So were three eggs manipulated 23 hours after egg capture and 12 eggs manipulated 28 hours after capture.

Ob. Gyn News reports: "Embryos developing after micromanipulation need to be evaluated for chromosomal normality before the technique can be advised for clinical use, Dr. Laws-King and her associates say."

Ob. Gyn News. 1988. Injection of single spermatozoa can produce fertilization. 23(6).

Congenital malformations after IVF

An analysis of data from the register of IVF and GIFT pregnancies in Australia and New Zealand reveals that IVF babies have had five times the expected rate of spina bifida and 6.7 times the expected rate of a major heart defect called transposition of the great vessels.

Philip McIntosh reports in *The Age* that these figures "may ultimately help the case for research on human embryos at a much later stage than is now legally permitted."

He quoted Dr. John McBain, a gynaecologist in the reproductive biology unit at the Royal Women's Hospital: "There's still a lot to learn, so research on *in vitro* fertilization should not be closed off."

To obtain useful information on the cause of the defects, McBain said, destructive embryo experiments would need to be done well past the current limit of 22 hours after insemination.

In the 1979–86 cohort of IVF pregnancies notified to the register by 16 IVF units, there were 1,694 live births and stillbirths of at least 20 weeks' gestation and three terminations of pregnancy after prenatal diagnosis of fetal abnormalities, reports Paul A. Lancaster, director of the National Perinatal Statistics Unit in Sydney.

Thirty-seven fetuses and infants had major congenital malformations, an incidence of 2.2 percent.

"Because the IVF figures included terminations of pregnancy and some infants whose malformations were diagnosed beyond the early neonatal period, they are not directly comparable with the incidence of 1.5 percent for major malformations in Australia." Lancaster wrote in *The Lancet*, "Nevertheless, the national data can be used to determine the expected numbers of major malformations diagnosed at birth or in the first week."

Six infants had spina bifida compared with an expected number of 1.2. (Two of these infants also had other malformations.) Four infants had transposition of the great vessels, compared with an expected number of 0.6.

"Transposition of the great vessels is a defect where the position of the main arteries leading from the heart is reversed," McIntosh writes. "Babies with this condition can survive only if there is an abnormal hole allowing mixing of blood from both sides of the heart. Without this mixing of blood, the body receives no oxygenated blood ..."

Lancaster comments on the findings: "The increased numbers of infants with spina bifida and transposition could be chance findings, but the probability for each is low. Three of the infants with spina bifida and two with transposition were from multiple births, which occur frequently in IVF after transfer of more than one embryo."

PAUL A. L. LANCASTER. 1987, December 12. Congenital malformations after in vitro fertilization. *The Lancet*: 1392–1394; PHILIP MCINTOSH. 1988, January 8. Birth defects claim fuels campaign against IVF. *The Age*.

General anaesthesia used for embryo transfer in a British IVF program

Physicians at the AMI Park Hospital, University of Nottingham in the United Kingdom, have placed women under general anaesthesia for the embryo transfer phase of the IVF procedure. Since they obtained eggs from some of these women using laparoscopy, this means that these women underwent general anaesthesia twice in one IVF attempt. Some of these women were not infertile, but were considered candidates for the program because their male partners were.

The physicians involved write that stress, uterine contractions or a difficult procedure may have an effect on successful embryo transfer. A physiological effect, they explain, may alter endometrial conditions and reduce the chance of implantation. A mechanical effect such as uterine contractions may expel the embryo from the uterus.

Difficult procedures requiring mechanical manipulations may traumatize the endometrium and induce spasms in the reproductive tract, they add. This problem has not been overcome by using muscle relaxants.

"Due to these concerns," the physicians write, "our Ethical Committee was asked to sanction the use of general anaesthesia during the replacement of human conceptuses after *in vitro* fertilization. This was agreed, but because of the possible advantages of general anaesthesia, it was considered unacceptable to the patients to have a group of matched controls."

First, the physicians experimented with the inhalation anaesthetic enflurane. Then they conducted a controlled study to compare the use of enflurane and the anaesthetic halothane during embryo transfer. They found that halothane may have an advantage over enflurane.

But does general anaesthesia itself make sense for embryo transfer?

The authors conclude their study with these words: "Whether general anaesthesia per se is beneficial for the replacement of conceptuses compared with either local or no anaesthesia cannot be assessed from this study."

Women of all ages, up to 42, with causes of infertility including tubal occlusion, endometriosis, male infertility and infertility of unknown origin, were experimented upon. The embryos were placed into the women in the lithotomy position under general anaesthesia.

The physicians write: "Volatile anaesthetics have been reported to induce feto-toxic and teratogenic effects, but to obtain relevant data is difficult, as experiments have incorporated high dosage effects and variations in the duration and timing of exposure . . . Some studies suggest that halothane may cause a delay in the cell cycle and induce segregated errors of chromosomes *in vitro* and prolong DNA synthesis."

Detailed *in vivo* experiments using halothane on mammals, they add, contradicted the *in vitro* studies and demonstrated that halothane does not induce mutation *in vivo.*

The physicians cite a study of the effects of halothane, enflurane, and methoxy-flurane on sea urchin gametes *in vitro* that found that halothane induced between 18 and 96 percent of the conceptuses to undergo abnormal cleavage at the first cell division.

The abnormal development was probably due to polyspermy, the physicians speculate. Halothane, they suggest, may interfere with the egg membrane to impair the block to polyspermy.

"These data would strongly suggest that halothane should be avoided at oocyte recovery," they write.

In concluding their paper, the physicians write: "Although Wharton *et al.* conclude that 'probably

all inhalation anaesthetics currently in use can cause embryo-toxic effects when administered to pregnant animals at anaesthetic concentrations for sufficient duration,' the current study suggests that in the context of general anaesthesia for the replacement of human conceptuses after IVF, while halothane is detrimental, enflurane is not deleterious. Whether general anaesthesia per se is beneficial for the replacement of conceptuses compared with either local or no anaesthesia cannot be assessed from this study."

SIMON FISHEL, J. WEBSTER, B. FARATIAN, and P. JACKSON. 1987. General anaesthesia for intrauterine placement of human conceptuses after in vitro fertilization. *Journal of in Vitro Fertilization and Embryo Transfer* **5**(5): 260–264.

Research opens way for "super-chickens" created through IVF

"The world's first test-tube chickens have been born in Edinburgh," *New Scientist* reports. "This development opens the way for researchers to create 'super-chickens' by inserting foreign DNA into chick embryos."

Margaret Perry managed to insert foreign genetic material into one-cell embryos and then culture them to hatching.

"This is the first time that any warm-blooded animal has developed completely *in vitro*," *New Scientist* writes.

LIONEL MILGROM. 1988. Test-tube chicks pave way for 'super-animals.' *New Scientist.* February 4: 36.

Partial ban on trade in human organs

"Health ministers from more than 20 countries in Europe have agreed to ban companies from selling human organs commercially for transplant," *New Scientist* reports.

However, the ban would not include "material from genetic sources such as testicles, ovaries, embryos, ova and sperm, and blood."

JANET MOHUN. 1987. . . . as European ministers outlaw trade in human organs. *New Scientist.* December 10: 16.

National IVF/ET Registry in U.S. announces survey findings

The National IVF registry, organized by Medical Research International and the American Fertility Society IVF Special Interest Group (IVF-SIG) and totally supported by Serono Laboratories, sole supplier of Perganol in the United States, presented its first report on data in *Fertility and Sterility.* The data covers 1985 and 1986.

According to Dr. Richard P. Marrs, past president of IVF-SIG, the information "is critical for the medical community to scrutinize and helpful for the lay public to better understand the problem of less than optimal outcome persisting within these technologies."

Of the 103 U.S. and foreign clinics enrolled in the registry, 41 U.S. clinics provided 1986 summary data. Thirty of these also provided data for 1985.

In 1985, 2,457 women were treated at the 30 clinics and 257 IVF children were born. Ninety of these children came from one clinic, the Jones Institute in Norfolk, Virginia. So the 29 remaining clinics produced an average of 5.7 children.

In 1986, 3,055 women were treated and 311 IVF children were born, 88 of them from the Jones Institute. The 40 other clinics reporting data for that year produced an average of 5.5 children.

The median number of women treated decreased by 24.2 percent from 1985 to 1986. The number was 62 in 1985, but 47 the following year.

The clinics performed 4,867 stimulation cycles in 1986, an increase of 946 (24.1 percent) over 1985.

In 1985, 94.2 percent of all egg retrievals were done by laparoscopy. In 1986, the percentage had dropped to 78.2 percent.

In 1985, nine clinics performed 166 ultrasound egg retrievals. The following year, 20 clinics performed 725.

There were 2,389 embryo transfer cycles in 1985 and 2,864 in 1986. In the earlier year, 83 percent of retrieval cycles resulted in an embryo transfer. In the latter year, 85 percent.

In 1985, 14.1 percent of cycles in which an ambryo was transferred resulted in a clinical pregnancy. In 1986, the percentage had jumped to 16.9. The number of cycles, respectively, was 337 and 485.

In 1985, there was a 5.9 percent ectopic pregnancy rate, 41.5 percent abortion rate and 1.2 percent stillborn rate.

In 1986, the rates were 4.5 for ectopic

pregnancy, 31.1 for abortion and 1.0 for stillbirths.

In 1985, nine clinics froze the embryos of 105 women. Frozen embryos were replaced in 26 treatment cycles. No clinical pregnancies resulted.

The following year, 15 clinics froze the embryos of 319 women. Frozen embryos were placed in women's uteruses in 112 cycles, a 431 percent increase over the previous year. Seven clinical pregnancies resulted. They occurred in three of the 15 clinics transferring frozen embryos. The clinical pregnancy rate ranged from 10.5 to 11.1 percent per transfer. (The clinical pregnancy rate for all those women who had their embryos frozen was 2.1 percent.)

Six children were born in 1986 from previously frozen embryos. There was one abortion.

Only one of the 41 clinics reported performing IVF with donated eggs in 1985 and 1986. During this period, the clinic did 32 embryo transfers using donated eggs. Eight clinical pregnancies and five liveborns resulted.

In 1985, the climes reported one case of chromosomal abnormality in an infant – trisomy 18. There were two congenital anomalies – cordi penis and diaphragmatic hernia. One infant was diagnosed with cerebral palsy at 12 months and another suffered a cerebral hemorrhage thought to be secondary to intrapartum asphyxia.

In 1986, there were three chromosomal abnormalities: trisomy 13, Klinefelter's syndrome and Turner's syndrome. Nine congenital anomalies were reported. In addition, one premature infant suffered a cerebral hemorrhage and died one week after birth.

In 1985, eight clinics performed gamete intrafallopian transfer (GIFT) in 47 women. Fifty-six GIFT cycles were performed. Three children were born. There was one abortion. Only two clinics performed GIFT in 10 or more women.

The number of women exposed to gamete intrafallopian transfer increased almost nine-fold in 1986, to 419. The number of clinics performing GIFT jumped to 25. They did 466 GIFT cycles. Eleven clinics did the procedure in 10 or more women. The number of clinical pregnancies rose to 103. There were seven ectopic pregnancies (6.5 percent), 24 abortions (22.2 percent) and no stillbirths. Sixty-four children were born.

Medical Research International and The American Fertility Society Special Interest Group. 1988. In vitro fertilization/embryo transfer in the United States: 1985 and 1986 results from the National IVF/ET Registry. *Fertility and Sterility* 49(2): 212–215; Information supplied by Tony Cappasso of the Public Relations Department, Jones Institute, Norfolk, VA, May 9, 1988.

Australian IVF couple die in suspected murder-suicide

John and Janette McDermott, a couple who had tried many times to have a baby through *in vitro* fertilization, were found dead in their home in Melbourne, Australia. Janette McDermott's mother, who lived with the couple, was also found with a gunshot wound to the head. Police suspect that the millionaire car dealer killed his wife and then shot her mother before turning a 9 mm Beretta pistol on himself.

There are two main theories for the tragedy:

- Business worries, but not financial prob-lems, may have triggered McDermott's actions.
- McDermott, 41, may have become dis-turbed after he and his wife, 37, failed in their attempts to have a child through IVF.

The couple had been friends of Professor Carl Wood, an IVF specialist at Monash University.

On February 16, Wood said: "I knew them as friends for several years and Janette used to write letters of support for the *in vitro* program."

Mr. McDermott, he said, was very upset that they could not have children.

Wood added: "Jan was at times upset and at other times accepting."

He said that Mrs. McDermott "found the treatments very difficult, having to have injections and blood tests every day."

"She wrote a lot and was very active," he said of Mrs. McDermott. "I felt that she was able to compensate for the fact that she couldn't have children. Mr. McDermott was very interested in ways of having a child, but I felt he deferred to her when she said she'd had enough."

In a letter to *The Age*, an unsuccessful former IVF patient, R. Anderson, com-mented on the deaths: "The mass media presents to the public the relatively few successes and medical achievements of the IVF teams. Rarely is there discussion of the enormous emotional toll and extreme depression that I, and others like me, have to contend with . . . The people running IVF programs must address themselves to the problems faced by the majority

of their patients who leave a program still without a baby."

R. ANDERSON. 1988, February 24. IVF failures need counselling. *The Age*; JANE PHILLIPS and JEFF JENKINS. 1988, February 17. Shot mum's tragic secret. *The Sun*; HELEN PITT. 1988, February 17. Why the crash spelt death for a loving couple. *The Sydney Morning Herald.*

Study finds GIFT and IVF have same failure rate for patients with idiopathic or male infertility

A randomized, controlled trial comparing gamete intrafallopian transfer (GIFT) with IVF showed no significant difference between the two procedures in resulting pregnancy rates with patients with idopathic or male infertility, *Ob. Gyn News* reports. The trial was conducted by Dr. John Leeton and associates at the Epworth Medical Centre in Melbourne, Australia.

One hundred couples underwent one of the procedures. If the first treatment failed, the alternative procedure was used on them on the next attempt.

After one year, nine couples achieved a pregnancy following gamete intrafallopian transfer and eight did so after *in vitro* fertilization and embryo transfer, according to the investigators.

Ob. Gyn News. March 1, 1988. Two methods of fertilization found similar in effectiveness. 23(5): 25.

Fate of orphaned embryos decided

In 1980, Elsa and Mario Rios traveled from California to Australia to enter an IVF program. Several of the fertilized eggs obtained as a result of the procedure were implanted in Elsa and the rest frozen.

The Rios' later died in an airplane crash leaving an estate worth US$8 million. The frozen embryos were in legal limbo.

"Court rulings on both continents were needed to get the embryos out of the deep freeze," Charles Morgan reports in *Nature.* "In May 1985, a California Superior court decided not to appoint legal guardians for the embryos and declared that they were not legal heirs to the Rios estate, nor were they its property. In Victoria . . . the Minister of Health, Mr. White (was given) the power to decide the fate of the embryos without parents. The embryos will be implanted in a prospective mother."

The embryos were frozen during the very early stages of the development of the embryo freezing technique so the possibilities of the embryos surviving are small.

A more recent report in the *Herald* (Australia) notes that there are serious obstacles to the embryos being donated to an infertile couple. Not only is there a slim chance of the embryos being successfully thawed, but there is also the fact that the Rios' had not been screened for AIDS.

A spokesman for the Infertility Medical Centre at Epworth Hospital said these questions would have to be examined before the embryos could be donated.

LYNNE COSSAR. 1988, May 6. New doubt on future of Rios embryos. *Herald*; CHARLES MORGAN. 1987. Orphaned embryos to be implanted. *Nature* 330: 512.

New legislation on IVF and embryo research forthcoming in Britain

The British government recently presented its proposed legal framework for embryo research, Human Fertilisation and Embryology: A Framework for Legislation. The proposal, which Parliament must vote on, provides that:

- The presently existing Voluntary Licensing Authority (VLA) will become the Statutory Licensing Authority (SLA) and will be given legal powers of enforcement.
- Cloning and the genetic manipulation of human embryos will be banned.
- Embryos may be frozen for up to five years, sperm and eggs up to 10 years.
- Informed consent must be given by donors of eggs, sperm and embryos.
- The mother of a child is the woman who carries the fetus even if she is not the one who donated the egg.
- Commercial surrogacy will be outlawed.

The Statutory Licensing Authority will consist of 15 to 20 people, half lay and half researchers. The Authority will grant licenses to *in vitro* fertilization clinics.

The most controversial issue is that of embryo research. Two alternative proposals have been written into the framework and Members of Parliament will be allowed to vote their conscience. One proposal would allow research on

embryos up to 14 days after conception under license from the Statutory Licensing Authority.

The other proposal would ban embryo research completely except in direct relation to the embryo being replaced in a woman's uterus under *in vitro* fertilization. The threat of a ban on embryo research has upset researchers and doctors.

GAIL VINES. 1987. Legislative plans threaten embryo research. *New Scientist* December 3: 23; SIMON HADLINGTON. 1987. British government hedges bets on embryo research. *Nature* 330: 409; DAVID DICKSON. 1987. British government rekindles debate on embryo research. *Science* 238: 1348.

VARIATIONS ON IN VITRO FERTILIZATION

Twins produced through Intraperitoneal Fertilization

In Vichy, France, twins were created using a new method of procreation, Intraperitoneal Fertilizaton (IPF). The technique consists of placing the sperm and egg together in the Douglas sack, a peritoneal cavity between the vagina and the rectum which is the natural receptacle for the egg when it is released from the ovary. Physicians inject sperm deep in the vagina into the sack hours after ovulation.

"After 72 hours, the peritoneal liquid contains the embryo or embryos which are withdrawn by injection and entered into the uterus," *Women's Health Journal* reports.

Twenty-seven women have undergone Intraperitoneal Fertilization. Five have become pregnant. One miscarried. One had an extra-uterine pregnancy.

1988, January. IPF: Intraperitoneal fertilization. Easier for women? *Women's Health Journal* (*ISIS*).

EMBRYO TRANSFER

Calf embryos for sale

"Livestock farmers will soon be able to buy 'test-tube' calves for implanting in their own cattle," *New Scientist* reports. "The method for developing, freezing and implanting the embryos is the result of collaborative work between University College Dublin [Ireland] and Masstock, an international farming company."

The previous method has been to stimulate the cow with hormones and then remove the eggs or inseminate the cow and flush out the fertilized eggs. This has made the technique unavailable to the everyday farmer.

In the latest development, "scientists collect ova (immature eggs) from slaughtered cows, nurture them in the laboratory to full maturity and fertilise and freeze them as seven-day-old embryos. The scientists then transfer these to recipient cows."

1987. Calves a la carte. *New Scientist.* December 3: 23.

Animal Research Station in England, privatised, becomes Animal Biotechnology Cambridge Limited

Animal Biotechnology Cambridge Limited has privatised the Animal Research Station in Cambridge, England, the former government-funded AFRC Laboratory.

The opportunity to incorporate the company and privatise the former Animal Research Station arose when government research cuts threatened the closure of the Station, the pamphlet reports.

"Firsts" at the Animal Research Station included:

- development of semen freezing,
- nonsurgical embryo transfer in cattle,
- first calves and lambs in the world born from frozen embryos in the 1970s,
- first animal clones.

In recent years, the laboratory has created an array of farm animals produced by techniques involving cellular and genetic manipulation of eggs and embryos.

These animals include genetically identical twins and quadruplets from embryo splitting, cross-species transplantation using chimaeric techniques, *in vitro* maturation and fertilization of sheep and pig eggs resulting in live offspring, sheep from eggs receiving foreign nuclei (which, the new company points out, is an important step towards animal cloning), and two generations of transgenic pigs carrying exotic gene constructs.

According to a pamphlet distributed by the new company, Animal Biotechnology Cambridge Limited's chief executive, Philip Paxman, "is skilled in transferring science into profitable

commercial ventures." Following his graduation from Cambridge, Paxman created "a successful international agricultural marketing firm, in which technology transfer, product development and licensing figured prominently . . ." This experience, the pamphlet notes gives the company just the expertise its role requires.

The new company maintains close links with the fundamental research at the AFRC Institute of Animal Physiology & Genetics Research and with Cambridge University.

Among the company's offerings to clients is a course on *in vitro* fertilization technology entailing exposure to IVF techniques practiced on laboratory animal models. This course, the pamphlet points out, "is of special value to medical and laboratory personnel working in the fields of human fertility and animal research."

The course includes the collection, maturation and capacitation of gametes, IVF and the culture, handling and preservation of early embryos, and morphological assessment. The Station comprises laboratories, two animal operating theatres, embryo transfer units, artificial insemination and collection facilities, laboratory animal breeding units, isolation and holding pens, and farm animal buildings.

The juxtaposition of laboratory, operating rooms and farm, the company points out, "facilitates the transfer of experimental material to and from the laboratory in novel procedures. . . ."

The company offers to its clients the skills needed for "the difficult transition from biological possibility to commercial reality. . ."

It notes: "Our role is to develop profitable new products and processes economically, in confidence, at minimum risk and with full protection of intellectual property rights for clients in the agricultural, food and pharmaceutical industries as well as those with a policy of investment in biotechnology."

The company observes that "major market opportunities" exist in the technologies where the company enjoys a commanding position:

- "large scale production of farm animal embryos to revolutionise the future of controlled breeding programmes . . .
- "future development of sex determination of embryos and semen and cloning methods will transform important markets in animal breeding.
- "the application of gene transfer technology to produce stock of superior performance and enhanced disease-resistance, and to develop molecular farming methods to create a range of biomedical products."
- In cryobiology, the development of storage techniques for the embryos of further valuable farm species such as pigs, "will create major new markets for genetic material."

Animal Biotechnology Cambridge notes that the use of transgenic animals as models in biomedical research is a rapidly growing practice. Its pamphlet includes a photo of the micro-injection of foreign cloned genes into the pro-nucleus of a pig egg and points out that genetic manipulation by gene transfer will have major applications in animal breeding, the pharmaceutical industry and biological research.

The company, it adds, is the first to offer a transgenic service.

The company also offers training in embryo transfer. It notes: "Controlled preselection of both maternal and paternal genes, allowing prime genetic resources to be multiplied on a large scale, promises an impact on worldwide livestock production unparalleled since the advent of artificial insemination."

At the level of the farm, it adds, the most important use of embryo transfer has been in cattle "for the multiplication of elite progeny . . ."

The company observes that gene banks for endangered species and rare breeds can be created by storing embryos. In addition, through superovulation and surrogacy, rare breeds can be multiplied.

Financial aid for training in embryo transfer is widely available through such agencies as the British Council, the Overseas Development Authority, the United Nations Development Programme and independent foundations "because of its importance for improving livestock production to the benefit of human nutrition in developing countries," the pamphlet notes. The company helps with introductions between suitable applicants and appropriate agencies.

Animal Biotechnology Cambridge. *Research Into Profit: Aims and Practices of the Animal Research Station.* (Pamphlet of Animal Biotechnology Cambridge Limited, Animal Research Station, University of Cambridge, 307 Huntington Road, Cambridge CB3 OJQ, England.)

Undated, received 1988.

SURROGACY

Mental health professionals urged to play major role in institutionalizing "surrogate" motherhood

To insure that everyone gives informed consent to the "surrogacy" arrangement, mental health professionals should play a major role, attorney Joan Wexler argued at a conference of the American Academy of Psychiatry and the Law.

Mandatory counseling is probably the best the law can do to prevent custody disputes such as the one that developed in the bitter "Baby M" case, Wexler, Professor of Law and Associate Dean of Brooklyn Law School in New York, said.

Wexler opposed the banning of surrogacy. *Ob. Gyn. News* reported on her argument: "To prohibit surrogacy, a practice for which demand will probably increase, is unlikely to work any better than it did with alcohol or abortion: some arrangements would still be made, with less monitoring than there is now. 'If it's criminal, costs will go up. There will be less protection for the child. Like it or not, there's only one choice . . . a regulatory framework.'"

Such regulation would require a surrogacy agreement specifying that the child would be the legitimate, natural child of the intended parents (not the mother) at birth. The contract, according to Wexler, would stipulate examination for sexually transmitted diseases and genetically determined illnesses.

Regulations might allow the mother to petition the court to amend or modify the agreement when compelling changes unforeseen at the time of insemination – such as the development of a health problem that makes subsequent childbearing impossible – have occurred.

Ob. Gyn News. 1988. Role of mental health workers in surrogate parenting. **23**(7): 50.

CHILD SELLING

Rumania sells children to bring in western currency

Arbetaren reports that Rumanian President Ceausescus' policies making birth control and abortion impossible to obtain has forced many women to abandon their children.

The children end up in institutions where they are then put up for market in exchange for Western currency. Six hundred US dollars is the going price, but the final sum may be much more as many papers have to be stamped before everything is legal and each stamp costs money.

The couples who take the children come mostly from France, Italy, Belgium and Israel.

According to *Dagens Nyheter,* Sweden is also involved in traffic in children. Because most couples want adoptable infants and not half-grown children, the market for babies has become a commercial venture. This has caused the growth of "child factories" where poor women in the Third World become pregnant for the purpose of selling the newborn child, *Dagens Nyheter* states.

1988. Barn mot hardvaluta. *Arbetaren*, December 2; AGNETA CLOAREC, STAFFAN NORRMAN and GAIL WATT. 1987. "Barnfabriker" for adoption. *Dagens Nyheter.* October 16.

SEX PREDETERMINATION

Sex determination banned in India

"Maharashtra has become the first state in India to ban prenatal sex determination testing on pregnant women," *Nature* reports. "Chief Minister S. B. Chavan said the decision was taken because of 'deep concern' over the widespread abuse of the test for aborting female fetuses. Legislation is to be introduced in February."

K. S. J. 1988. Sex test banned. *Nature* 331: 103.

Sex predetermination appears to be gaining physician acceptance in the US

The Ericsson method of separating x- and y-bearing sperm by albumin filtration, once controversial, appears to be gaining physician acceptance, investigators told Bruce Jancin of *Ob. Gyn News* in telephone interviews.

"Some skepticism lingers, however, particularly among academicians unsettled by the commercialism surrounding the Ericson method as well as the lack of randomized, controlled, prospective data in humans," Jancin writes.

He notes that neither the American Fertility Society nor the American College of Obstetricians and Gynecologists endorses as reliable any sex predetermination method.

Ronald J. Ericsson, PhD, founded Gametries,

Ltd. in 1974 to capitalize on his patented sex predetermination method. There are now 55 Gametrics centers in the United States, including 18 new ones that opened up in 1987.

Ericsson expects to limit his company to about 200 centers in the US, Jancin reports, but expects enormous international growth, particularly in countries where the cultural desire for sons is strong, such as Pakistan, South Korea, and Malaysia.

Gynecologists can open a Gametrics center by paying a $7,500 initiation fee and a 17 percent royalty fee every time they use the Ericsson method.

Dr. Ronald K. Burke, a former skeptic about sex predetermination, did an about-face last year and became licensed to open a Gametrics center. Burke, a reproductive endocrinologist at the University of Massachusetts Medical School, told Jancin: "I think there is now a place for gender preselection. I think that concern about the scientific validity is beginning to fall by the wayside. A larger number of very respected individuals have now accumulated a significant number of total births."

Physicians at Gametrics centers report 74 percent boys in 450 births using the original method and, in the last year, an 86 percent success rate (43 boys and only seven girls) using a refined technique.

Dr. Sandra A. Carson, an ob. gyn. and fertility investigator at the University of Tennessee College of Medicine, is not convinced that the Ericsson method works. She would like to see a prospective evaluation of it involving artificial insemination of treated or untreated sperm samples in a randomized, double-blind fashion.

"I really don't know whether the Ericsson method works," she told Jancin. "I'd like to see it work; I think we need a method of sex preselection. But I personally am just not convinced."

Jancin writes: "Dr. Ericsson believes the study Dr. Carson wants is unnecessary and impractical, and he's unwilling to allow use of his method without royalty payments."

The method has already undergone independent testing, he feels, because he did not charge royalties to investigators during the first six years of clinical use.

Ericsson has been criticized for patenting a methodology and impeding the free flow of information among scientists, but he believes that such criticism has dissipated with the explosion of the biotechnology industry in the 1980s. That entire industry is built upon patented techniques involving recombinant DNA.

A number of methods are used to predetermine the birth of girls. Success rates of about 75 percent in small patient series have been reported for two methods.

According to Jancin, Dr. Ferdinand J. Beernick, an ob. gyn with an infertility practice in Berkeley, California, has tried both female predetermination methods and has been disappointed with the results.

"Female sex preselection is much less well established, and I certainly would be the first person to say there's not enough data to tell us what to do," he said.

BRUCE JANCIN. 1988. Prenatal gender selection appears to be gaining acceptance. *Ob. Gyn News.* 23(5).

Gene that determines sex discovered

Embryos start life with the potential to become either male or female. At about seven weeks, something happens that determines which sex the embryo will become.

According to *Science,* researchers believe that a substance called testis determining factor (TDF) is produced which, when present, causes the formation of testes (male) and, when absent, causes the formation of ovaries (female). These organs then secrete hormones that cause the embryos to develop into males or females.

Researcher David Page has found what he believes is the TDF gene on the Y chromosome. What the gene codes is for it, is still unknown. The gene has been detected in every mammal they have tested.

A similar gene also exists on the X chromosome which means that theories about how genes determine sex will have to be modified. Previously, it was believed that the presence of the TDF gene (Y chromosome) caused a male and its absence (two X chromosomes in females) caused a female. One new theory is that the two genes work in concert, possibly producing two halves of a protein. If one half is missing then the embryo

develops into a female.

LESLIE ROBERTS. 1988. Zeroing in on the sex switch. *Science* 239: 21–23.

CLONING

Cloning of domestic animals becomes a reality

"The commercial cloning of domestic animals is becoming a reality," writes Jean L. Marx of *Science.* "Researchers have developed cell fusion methods that have the potential of producing multiple, perhaps even unlimited, copies of individual sheep and cattle. The idea is to use cloning as a way of obtaining large numbers of genetically predictable animals with superior milk- and meat-producing capabilities."

Cloning was first developed by Steen Willadsen in England. He took sheep embryos that had divided to the eight-cell stage. An embryo was treated so that the cells were separated from each other to form eight identical single-celled embryos. Each embryo could then be implanted into a surrogate sheep leading to the possibility of eight identical lambs being born.

This method can also be used on cattle. Researchers have found that it is possible to get up to 32 identical clones from one cow embryo. The idea is to "implant some of them in foster mothers and raise the resulting calves so that their milk or meat production can be assessed," Marx writes.

The rest of the embryos can be frozen and stored. After a few years it should be clear which calves are best and the rest of the clones can be thawed and either implanted or allowed to divide to the 32-cell stage so 32 new embryos can be made.

Willadsen has moved to the University of Calgary in Canada and has recently "produced calves by cloning cells from frozen embryos and from second-generation embryos," according to *Science.*

These experiments are just getting started, but Willadsen sees no "insurmountable difficulties with them."

JEAN L. MARX. 1988. Cloning sheep and cattle embryos. *Science* 239: 463–464.

CONTRACEPTIVES

Anti-pregnancy vaccine to be tested on women in Australia and Southeast Asia

A contraceptive vaccine has been developed that will immunize a woman against pregnancy. It is the result of 14 years research by the World Health Organization.

Deryn Thorpe writes in the *Australian* that the vaccine "has no side effects" and can stop pregnancy for up to nine months with one injection.

According to Professor Warren Jones of the Department of Obstetrics and Gynecology at Adelaide's Flinders University, 400 women from Australia and Southeast Asia will be tested with the vaccine.

At the Fourth Australian Congress on Obstetrics and Gynecology, Professor Jones explained that the vaccine prompts the body to make its own antibodies against pregnancy.

"Women are injected with the hormone HCG (the main component of the vaccine) which makes the body produce antibodies to stop or disrupt the early development of the fertilized egg or the implantation of the early embryo," he said.

DERYN THORPE. 1987, October 13. Contraceptive vaccine on way. *The Australian.*

Fund established for victims of the Dalkon Shield

A U.S. court ruled December 11, 1987 that A. H. Robins, manufacturers of the Dalkon Shield intrauterine device (IUD), must set up a compensation fund of 1345 billion pounds. The ruling followed a long legal battle in the U.S. An estimated 250,000 women around the world are eligible for compensation from the fund.

Women have made claims for injuries caused by the contraceptive, injuries that included pelvic infection, abortion and infertility. Twenty women are thought to have died because of the contraceptive.

The Dalkon Shield was withdrawn from the U.S. market in 1974 following reports of death and infection. At that time, it was the largest selling IUD in the world.

The Lancet reports: "The manufacturers did not inform doctors of the need to remove the device from long-term wearers until 1980. Nor did they warn the public at large of the dangers attached to continued use of the Dalkon Shield until 1985 when A. H. Robins undertook an expensive

advertising campaign. The company filed for bankruptcy in 1985 in order to protect itself from a burgeoning number of lawsuits."

December 19,1987. Compensation for users of Dalkon Shields. *The Lancet:* 1478.

Sterilization increasing as a method of birth prevention

Sterilization as a form of contraception is increasing, medical experts report. Until recently, most sterilization was performed on married people in their 30s who had children. The new trend is for sterilization of younger single and married people who have decided not to have children. Australian government figures indicate that an estimated one million women and men have been sterilized in 17 years. Twice as many women as men have undergone the surgery.

Over the last six years, somewhere between 50,000 and 80,000 sterilizations were performed a year. The Department of Human Services estimates that 60 percent of Australian couples between 30 and 40 will choose sterilization as their form of contraception. About one percent of those sterilized request reversals. Many of these requests come after people remarry and acquire a new interest in offspring.

JAYA BALENDRA and EDWARD BUNETTI. 1987, September 11. Many young couples opt for sterilization. *The Age.*

ABORTION

Man sues wife on abortion performed without his knowledge

New York orthodonist David S. Ostreicher has filed suit against his wife, seeking a divorce and monetary damages because she had an abortion without his knowledge or consent. He is also suing the doctors who performed the abortion and the hospital where it was performed, on the grounds that they had a moral obligation to advise him of the abortion in advance.

"It is the third case in as many weeks in which men across the nation have argued that fathers-to-be should have a say over whether a pregnant woman may have an abortion," reports Tamar Lewin in *The New York Times.*

Dr. Ostreicher told a news conference: "This is a case of father's rights, of husband's rights. It's a case of an outrageous act that a wife did against a husband. Without my knowledge or consent, she took our baby and ripped it out of her."

He contends that his wife had the abortion to spite him after he refused to tear up a prenuptial agreement they had signed before their marriage in 1985.

Mrs. Ostreicher's attorney, C. Judsen Cender, told *The New York Times*: "... Not only did he [Ostreicher] know about the abortion, not only did he consent to it, it was his idea. He advised her he didn't want to support the baby. He didn't want to be a father. He's using this lawsuit to get a better financial arrangement. I think he knows that the prenuptial agreement that he rammed down her throat would not stand up in court."

In a recent case in Utah, a state judge issued a temporary order forbidding a pregnant 18-year-old to have an abortion, heeding the arguments of her estranged husband. But at a hearing a week later, he found no basis for a permanent order. The woman had the abortion.

In Indiana, the week before the Ostreicher suit, an 18-year-old woman whose boyfriend had won a court order forbidding her to have an abortion violated that order and had the abortion. The boyfriend had obtained the order in an unusual paternity action on behalf of the fetus.

In the wake of Roe vs. Wade, the 1973 U.S. Supreme Court decision guaranteeing women's constitutional rights to abortion, Lewis reports, "Many states tried to enforce laws requiring a woman having an abortion to notify her husband, or, in some cases, get his consent. But in 1976, the high court struck down a Missouri law that required the husband's consent for a woman to get an abortion."

TAMAR LEWIN. 1988, April 22. Man sues wife on abortion done without his knowing. *The New York Times*: B2.

Nazi study used to justify anti-abortion stand

A bill requiring a minor to obtain the consent of her parents or a judge in order to get an abortion became law in Pennsylvania, USA in April. The law also requires a low income woman whose pregnancy results from rape or incest to report the crime in order to be eligible for a state-paid abortion.

The main proponent of the parental consent law and the state legislature's leading anti-abortion advocate, Representative Stephen F. Friend, used a World War II Nazi study to back up his claim that women who are raped rarely become pregnant because they are under great duress.

He cited a 1972 article by Dr. Fred E. Mecklenburg. Mecklenburg wrote: "In Germany, during World War II, the Nazis tested this hypothesis [on the relationship between pregnancy and stress] by selecting women who were about to ovulate and sending them to the gas chambers, only to bring them back after their realistic mock-killing, to see what effects this had on their ovulatory patterns."

According to his report, 64 percent of the women did not ovulate.

April 1988. PA passes parental consent measure. *National NOW Times.*

ACTIVIST JAILED

Activists jailed in Malaysia

Heng Leng Chee was arrested by the Special Branch police at her home in Petaling Jaya, Malaysia October 27, 1987 and in December she was issued a two-year detention order that may be renewed indefinitely. It appears that Heng Leng, a graduate of Wellesley College and the Harvard School of Public Health in the United States, may have been detained because she coedited the book *Designer Genes: I.Q., Ideology & Biology. Designer Genes* is critical of the sociobiological theories favored by Malaysian Prime Minister Datuk Seri Mahathir Mohamed in his social and economic programs.

Heng Leng also works with the Women's Development Collective and the Institute of Social Analysis, a group that, according to members of the Committee for Human Rights in Malaysia, has been singled out for government repression.

Since October 27, more than 150 Malaysian citizens have been arrested and detained without charges under the Internal Security Act. The act permits the indefinite "preventive detention" of anyone deemed by the government to be "likely to act in any manner prejudicial to the security of Malaysia."

Designer Genes "refutes arguments for genetic differences in intelligence and abilities among different peoples," the human rights committee members write in *Science for the People.* "The two leading essays, coauthored by Heng Leng, illustrate how the leaders of Singapore and Malaysia have utilized such unproven genetic arguments to further their own interests."

Harvard School of Public Health professor Paul Wise, who went to Malaysia in January to investigate human rights violations in the arrests of social critics, believes that international pressure will help to win the release of the detainees, including Heng Leng.

Members of the Committee for Human Rights in Malaysia urge readers to write to Prime Minister Datuk Seri Mahathir Mohamed, Prime Minister's Department, Jalan Dato Onn, Kuala Lumpur 11-01, Malaysia. The letters could inquire as to the charges against Heng Leng Chee and the other Internal Security Act detainees, and request their immediate unconditional release or their right to a prompt and open trial.

Members of the Committee for Human Rights in Malaysia. 1988, March/April. Repression in Malaysia: biological determinist jails opponents. *Science for the People*: 16–18.

Arrests in West Germany

Two women were arrested by the federal police in December of last year during raids directed against many women protesting about genetic engineering and immigration policies in the Federal Republic of Germany (see Issue 1(1) for full report). Considerable international support for Ulla Penselin and Ingrid Strobl, and protests to the government were sent from Britain, the USA and other countries. This has helped to ease their prison conditions somewhat. They are now allowed to wear normal clothing, are no longer in strict isolation, and are allowed to participate in yard walking. However, conditions are still difficult and a trial will not be heard for some time. For this reason, at the end of July their lawyers will try to gain their release by invoking a 6 month rule, but they are not very hopeful as political prisoners are treated worse than other categories. There is great concern about Article 129a of the Criminal Code which allows premises to be searched without warrant and to detain and strip-search women. Further information about the cases can be obtained from: Malin Bode, Herner Strasse 1 ("Kortlander"), 4630 Bochum 1, FRG.

Note: Ulla Pensellin was released on 22 August 1988, although charges and trial may follow.

PRENATAL DIAGNOSIS

New test for Down's syndrome

Doctors in London have developed a blood test that they hope will be able to detect whether a woman is carrying a child with Down's syndrome, *New Scientist* reports. The blood test measures the mother's level of estriol which is unusually low when the fetus has Down's.

The usual method for detecting Down's is amniocentesis. (Fluid around the fetus containing fetal cells is taken, the cells grown in the laboratory, the chromosomes stained and examined. Fetuses with Down's have an extra chromosome.)

Amniocentesis detects only 16 percent of affected pregnancies, but the new test may make it possible to detect 45 percent.

Howard Cuckle at St. Bartholomew's Hospital in London says: "I'm quite confident that within the next few years, we will be able to do with Down's syndrome what we have done for neural tube defects, which is to dramatically decrease the prevalence of such births."

SHARON KINGMAN. 1987. New test will improve detection of Down's syndrome. *New Scientist* December 24/31: 7.

Prenatal diagnosis of embryos

British embryologist Anne McLaren takes up the possibilities of diagnosing genetic diseases in human embryos in *New Scientist.* Amniocentesis has been used for older women whose risk of having a child is higher.

She states: "In Denmark where such screening is widely available, the incidence of Down's among babies born to women over 35 has fallen threefold since the 1970s."

But terminating a pregnancy after amniocentesis is stressful as it is done very late (20 weeks or later). The new method of chorion biopsy, where fetal cells are removed from the placenta for testing, can be done as early as 8–10 weeks. The results are available after a week.

McLaren continues: "The termination of a wanted pregnancy, even in the first trimester after chorionic villus sampling, is distressing. It means that a woman who seeks to have a child has to go through the first two months of pregnancy (often the worst part) to no avail."

The solution to this problem is to screen embryos before they implant in the uterus, so-called 'preimplantation diagnosis.' In this procedure, a few cells from each embryo would be removed and analyzed for genetic defects. The 'healthy' embryos would then be implanted in the woman's uterus.

At present, this would only be possible to do for embryos generated from *in vitro* fertilization programs.

The procedure has already been done with embryos from small apes, but has not yet been attempted on human embryos.

Another future possibility would be to give the woman fertility hormones, allow her to have normal intercourse and then flush the fertilized eggs out of her uterus five or six days later. The eggs would be analyzed and frozen and the woman would return to the clinic a month later to have the healthy ones implanted.

One problem with flushing, however, is that it has been known to cause ectopic pregnancies, where the fertilized egg develops outside the uterus.

ANNE MCLAREN. 1987. Can we diagnose genetic disease in pre-embryos? *New Scientist.* December 10: 42–47.

Chorionic villi sampling performed through woman's abdomen termed effective

Chorionic villi sampling can be performed safely and effectively for early prenatal diagnosis in women who are not candidates for a procedure performed through the cervix, two speakers predicted during separate presentations at the annual meeting of the Society of Perinatal Obstetricians in Las Vegas, Nevada, US.

Dr. Robert J. Carpenter Jr. of the prenatal diagnostic center at Baylor College of Medicine, Houston, said that at his institution, the transabdominal procedure was easier to learn than the transcervical approach and netted larger tissue samples with a comparable fetal loss rate. The double, thin-walled spinal needle used was passed through the woman's abdomen only once in 97 percent of attempts to obtain an adequate tissue sample.

Dr. Angela Scioscia of Yale University School

of Medicine, New Haven, agreed that transabdominal CVS is a safe and reliable means of prenatal diagnosis.

Ob. Gyn News. 1988. Transabdominal CVS terms effective for prenatal diagnosis. 23(6): 2.

FETAL THERAPY

Fetal therapy expands

While the debate over placement of shunts in fetuses with obstructive hydrocephalus resumes, other experimental efforts to treat diseases in the fetus are about to bear fruit, Dr. Frank Manning said at the annual meeting of the Southern Perinatal Association.

Within months, physicians will read the first reports of transplantation of stem cells in fetuses to treat sickle cell disease and alpha- and beta-thalassemia, predicted Manning, chair of the department of obstetrics and gynecology at the University of Manitoba Faculty of Medicine, Winnipeg, Canada.

Hemophiliacs and isoimmunized fetuses could also benefit from this treatment that would prevent expression of their disease, Manning said.

In the more distant future, he added, physicians will be able to use single gene replacement for other genetic diseases.

Ob. Gyn News reported: "One investigator has undertaken surgical correction of diaphragmatic hernias in five fetuses. Unfortunately, none has survived."

Placing a shunt in a fetus with obstructive hydrocephalus may be indicated under certain circumstances, despite the unofficial moratorium on the procedure, Manning argued.

A fetal shunt was first performed in 1982.

"However, use of the procedure, which is thought to preserve neurons, has fallen out of favor because many fetuses who undergo shunt placement develop severe handicaps," *Ob. Gyn News* reports. "Also, deaths have occurred."

Ob. Gyn News. 1988. Shunt for obstructive hydrocephalus may be indicated at times. **23**(6): 3.

FETAL TISSUE

US federal agency forbids implanting of fetal tissue

The US National Institutes of Health (NIH) have refused permission to their researchers to treat patients with implants of fetal tissue until an expert committee studies the legal and ethical issues.

Dr. Robert Windom, Assistant Secretary for Health, wrote to the director of the NIH that there should be no experiments in transplanting fetal tissue from elective abortions until the issues are studied. Windom, who asked the director to form an expert committee, told *The New York Times*' Gina Kolota that he expects the committee to reach a decision within a few months.

The federal researchers had proposed to implant fetal brain tissue into the brains of people with Parkinson's disease to try to correct the loss of neural tissue that causes the disease.

Kolata writes: "Similar experiments on monkeys have been highly promising and Mexican scientists have reported treating two Parkinson's disease patients with fetal tissue implants, but no American researchers have done so yet."

If the committee decides against government funding to support fetal tissue transplants, Kolota notes, the work would be likely to go on anyway but in the private sector.

GINA KOLATA. 1988, April 16. Federal agency bars implanting of fetal tissue. *The New York Times*: 1.

GENETIC ENGINEERING: AGRICULTURAL USES

First field trials set in the Netherlands

"Field trials of genetically modified plants are expected to be carried out for the first time in the Netherlands this year," *Nature* reports. "The biotechnology company Mogen International has succeeded in inserting a foreign gene into potato plants conferring resistance to viral infection."

First approval of the test has been granted and permission from the community (Dronten) is expected soon. Laws regulating the testing of genetically altered organisms in the environment are expected by the end of 1988.

CASPER SCHUURING. 1988. Dutch field trials. *Nature* 331: 107.

Field test of genetically engineered bacteria sabotaged

Environmental activists from the group Earth First! have again tried to stop field tests of the "ice-minus" bacteria on strawberry plants, according to *Nature* and *New Scientist.* Two days before the test was to begin, the activists managed to climb a fence and get past guards at the test site. They then spread rock salt on the plants.

This is the third time that field tests of the frost-preventing bacteria have occurred and the third time activists have attempted to sabotage them.

When Advanced Genetic Sciences (AGS) held a previous trial, activists removed the strawberry blossoms that were needed for the test. AGS said the test was successful anyway since it showed that no bacterial spread outside of the test area and the bacteria did protect against frost.

AGS is now looking for alternative testing sites such as in Italy, where no regulations exist for testing genetically manipulated organisms.

MARCIA BARINAGA. 1987. Strawberry plants attacked in Californian field tests. *Nature* 330: 512; 1987. Thugs halt gene tests. *New Scientist* December 10: 15.

U.S. General Accounting Office finds membership of biosafety committee unbalanced

Following an unauthorized, deliberate release of a genetically altered organism last summer, the General Accounting Office (GAO) carried out an investigation of the incident. It concluded that biosafety committees have "too many members with back-grounds in genetic engineering and too few specialists in physical containment, epidemiology, ecology and large-scale fermination techniques. Committee chairmen also confessed to ignorance of the rules governing biotechnology."

CAROL EZZELL. 1988. Unauthorized environmental release cleared by NIH. *Nature* 331: 202.

EPA suggests review committees for environmental releases

The US Environmental Protection Agency (EPA) plans to form review committees called "environmental biosafety committees" which will oversee the approval of field tests of genetically altered organisms, Carol Ezzell reports in *Nature.*

Regulations have been unclear about who has responsibility for different aspects of such research. This was emphasized last year when scientist Gary Strobel tested a genetically altered bacteria on elm trees in Montana without approval from the EPA.

EPA is planning to extend the Toxic Substances and Control Act to cover research and development work, Ezzell reports. She adds, "... the environmental biosafety committees would oversee the application of this statute in biotechnology research settings."

The committees would be set up at each university with such research and would consist of three experts in microbiology or plant ecology and two representatives from the local community. They would be required to answer questions and solicit comments from the community.

CAROL EZZELL. 1988. Another wrinkle in patchwork of US environmental release. *Nature* 331**:** 107.

Biotech companies to test ban on animal patents

The US Patent Office recently approved the patenting of a genetically engineered animal. European rules state that animals cannot be patented. According to Steve Connor of *New Scientist,* biotechnology companies plan to challenge this.

"Two companies, one British and one American, have applied for European patents on the technology for inserting human genes into the embryos of mammals. When these 'transgenic' animals mature into adult females, they secrete human proteins in their milk. Companies can harvest these proteins for medical or industrial use," Connor writes.

The companies' challenge is over the wording in the European Patent Convention. The Convention was written to prevent the patenting of "animal varieties" so as to prevent monopolies forming around certain breeds.

Lawyers for the companies argue that this does not apply to "animals." The patent office will probably counter that all animals are varieties.

A decision is expected within the next two years.

STEVE CONNOR. 1988. Firms to fight ban on animal patents. *New Scientist.* February 11: 21.

New Scientist editorial opposes the use of growth

hormone in cows

New Scientist has published an editorial protesting the use of bovine growth hormone (BST) on cows to increase their milk output.

"The public . . . is about to be assailed by the notion that milk is best generated by cows boosted artificially with the hormone responsible for increasing the yield of milk."

The hormone is produced by bacteria with the hormone gene inserted into their own DNA. Commercial companies then sell the product to farmers who inject their cattle with it.

"It is not entirely clear, however, how the consumer will benefit from this new trade. Europe is awash with milk . . . It comes as little surprise to find that one of the potential beneficiaries in this story, the chemicals company, Monsanto, which is ready to supply farmers with the hormone, has begun a propaganda campaign to convince the public that BST milk is no different from ordinary milk," the editors write.

Monsanto has supported studies showing that BST does not appear in the milk and has released the results before the scientists themselves had a chance to publish them. The company would probably not be so interested in publishing the results if they had shown the opposite, concludes *New Scientist.*

1988. Poor science, poor cow. *New Scientist.* February 11:20.

New committee on life sciences in US

A new committee on life sciences has been formed and is to be chaired by Beverly Berger of the White House Office of Science and Technology Policy. The new committee will oversee the human genome project as well as take part in biotechnology regulation.

JOSEPH PALCA. 1987. Changing features sighted on the biotechnology horizon. *Nature* 330: 512.

Biocenter to be built in Vienna

Nature's Steven Dickman states that the University of Vienna has announced "its intention to build a Biozentrum in the city's third district. The centre will house five university institutes from the medical and science faculties. The creation of the centre fulfils an informal promise that the Austrian government made to Genentech and Boehringer Ingelheim when those two companies decided to locate their Institute for Molecular Pathology in Vienna. The two institutions will be adjacent and will share support facilities."

STEVEN DOCLMAM. 1987. Vienna to gain biology centre. *Nature* 330: 686.

US stock market crash affects biotech companies

The New York Stock Market crashed October 19, 1987, sending shock waves around the world. Biotechnology companies were not doing well before the crash, according to Mark Crawford of *Science.*

"But in the two weeks spanning 12 October to 28 October, investors saw the stock values of 60 prominent, publicly traded biotechnology companies plunge 44 percent on average – a far steeper decline that the overall 28 percent drop in the stock prices of the nation's 400 largest companies."

The result? Small companies low on cash are having to merge with large companies. Only Genentech seems to be recovering since its new product TPA was recently approved for marketing.

MARK CRAWFORD. 1987. Biotechnology's stock market blues. *Science* 238: 1503–1504.

US drug company buys into British university

The drug company SmithKline Beckman of Philadelphia (US) is paying one million US dollars to help refurbish labs at the School of Clinical Medicine, Cambridge University in Britain. The drug company will also pay US$250,000 per year for five years to support research in molecular biology.

New Scientist reports that "in return for sponsoring research at the university, the company will have first refusal on inventions from the new laboratory."

All results will be kept confidential until patents have been received.

MARY FAGAN. 1988. Drugs firm buys into cradle of research. *New Scientist.* January 28: 126.

Sweden's Center Party wants laws to regulate biotech

The Swedish Center Party wants biotechnology regulated by law. Otherwise, it says, Sweden will become a free zone for genetic experiments. At present, there are no regulations governing the release of genetically manipulated organisms into the environment. The Center Party would like to see a ban on this type of research similar to that in effect in Denmark.

1988. Centern vill ha lag om bioteknik. *Dagens Nyheter.* January 17.

Center Party's youth group critical of Volvo's biotech affairs

Volvo Corporation is Sweden's biggest industry. Via several of its subsidiaries, it is part owner of Advanced Genetic Sciences Inc. and Plant Genetics Inc., both biotechnology companies.

The Center Party's youth group is critical of Volvo's involvement in biotechnology. They fear that genetic engineering of plants will lead to farmers in the Third World becoming dependent on multinational corporations for seed, pesticides and fertilizers.

In the future, products of Third World countries may be produced by biotechnology. Sugar, rubber, cocoa and tobacco are the economic backbone of many developing countries. The youth group fears that production of these crops and products by biotechnology will mean the death-knell for many of these countries.

1988. CUF-protest mot Volvos genteknik. *Dagens Nyheter.* January 31.

GENETIC ENGINEERING: HUMAN APPLICATIONS

Status of DNA fingerprinting in Britain

All individuals have a unique set of DNA (genetic material). DNA fingerprinting is based on this fact. Half the DNA is inherited from the mother, half from the father.

Using a special technique developed by Alec Jeffreys, the DNA can be treated with enzymes that break it up into small pieces and then these pieces can be separated based on their size. These react with gene probes and produce dark bands that look like a supermarket bar code.

Everyone has a unique pattern of bands. Relatives have bands in common. Thus, DNA fingerprinting can be used to identify a person as well as to determine relationships between people.

According to Steve Connor of *New Scientist,* in Britain this has been used by immigration authorities to determine whether a boy from Ghana was really a woman's son and not just her nephew.

DNA fingerprinting is also being tested in 40 Bangladeshi families for its feasibility in immigration cases.

Forensic scientists are interested in the technique as it can be used to identify a person based on very small amounts of blood, semen, or even hair left at the scene of a crime.

Cellmark Diagnostics is ICF's new company for carrying out genetic fingerprinting. So far, 60 percent of their tests have been for immigration cases; another 30 percent for paternity cases.

STEVE CONNOR. 1988. Genetic fingers in the forensic pie. *New Scientist.* January 28: 31–32.

Criminals' DNA fingerprints to be stored in database

"The world's first computerized data bank of DNA fingerprint information on convicted criminals is now being planned," reports Marcia Barinaga in *Nature.*

The data bank will be set up by the California attorney general's office and will be used to identify and prosecute criminals.

DNA fingerprinting, according to the Jeffreys method, is time-consuming. Simpler DNA fingerprint methods are being developed that are easier to perform and that make data storage easier.

One such method, the "dot-blot," has been developed by Cetus Corporation. Cetus plans to market a "dot-blot" kit that any laboratory can use. The database will be built up using blood and saliva collected from 5000 sex offenders in California.

MARCIA BARINAGA. 1988. DNA fingerprinting database to finger criminals. *Nature* 331: 203.

New tools in DNA sequencing for the Human Genome Project

A faster, more accurate method for sequencing the human genome (all genetic material) has been developed, Jeremy Cherfas reports in *New Scientist.* Right now, sequencing is the slowest aspect of the project to map and sequence the

entire human genome. It will require at least several decades.

The current system relies on radioactively labeled probes and a time-consuming system to work out the sequence. After separating the bits of DNA on a gel plate, a photographic film is laid over it. The radioactive labels will then develop the film where the particular DNA bits are. The result looks like a ladder. The sequence is then worked out from this picture.

A new method uses fluorescent dyes instead to label the bits of DNA. The DNA is separated on a gel plate. A special light scans the gel causing the dyes to fluoresce. A computer then figures out the sequence based on the fluorescing dyes.

JEREMY CHERFAS. 1988. Fluorescent dyes step up the pace of DNA sequencing. *New Scientist.* January 14: 42.

Foundation on Economic Trends stops research projects in US

The public interest Foundation on Economic Trends, based in Washington, D.C., has sued the National Institute of Health (NIH) and the US Department of Health and Human Services, William Booth reports in *Science.*

The suits involve two sets of research that the Foundation considers hazardous and therefore, should require environmental impact statements.

The first project, conducted by researcher Malcolm Martin, involves transgenic mice that have the entire genetic code of the IVF virus in every cell. Martin's research was questioned even by his peers.

"They were worried about putting the AIDS virus into the germline of mice," Martin explained. "Like everybody at NIH, they've walked down the halls at night and have seen mice running around."

Martin was finally granted permission to go ahead with the project under more controlled forms. But the Foundation worries that even if Martin is taking precautions, there are no rules for dealing with this kind of research. Others might not be as careful.

The second experiment involves cancer cells that have been infected with the HIV virus. This particular strain of cancer cells, HeLa cells, are known to contaminate other cell lines quite easily.

The Foundation is concerned that the HIV-infected HeLa cells may contaminate other cell lines that could then expose lab personnel to the AIDS virus without their knowing it. It is also worried about vectors used in cancer research. Many of them are based on E. coli, the bacteria found in our intestines. If they were to be ingested by a laboratory worker, they could produce cancer-causing proteins.

WILLIAM BOOTH. 1988. Of mice, onco-genes, and Rifkin. *Science* **239**: 341–343.