EMBRYO TRANSFER

FROM THE DAIRY CASE TO THE BUTCHER BLOCK

LONDON—A new line in frozen beef has become available in the United Kingdom. The basic product, now being offered by Animal Biotechnology Cambridge Ltd. (Cambridge, U.K.), is a pair of deep-frozen beef cattle embryos which will enable a dairy cow to give birth to twin beef calves.

Starting with technology developed by scientists employed by the now-privatized Agriculture and Food Research Council Animal Research Station at Cambridge (U.K.), the three-year-old company has scaled up; a production laboratory able to produce 50,000 embryos a year is to be set up in Scotland.

The paired embryo transfer process begins by collecting cow ovaries from abattoirs. Each ovary yields about 20 useful oocytes, obtained from Graafian follicles that are judged to be of appropriate size. The oocytes are laboratory-cultured for 24 hours—to encourage the resumption of meiosis—and then fertilized with selected semen. Six days of culture in controlled medium matures the fertilized eggs into early blasto-

cyst-stage embryos ready to be transferred immediately to cows or frozen for later use. Transfer is a simple non-surgical procedure much like artificial insemination.

Based on past experience, says the company's scientific director, Christopher Polge, a cow given a pair of embryos has a 70-percent chance of a pregnancy—much the same rate as with artificial insemination. But while the older technique does not increase the chances of twinning above the natural rate of two percent, almost half of the pregnancies after paired embryo transfer result in twins.

Further, while every dairy cow must calve each year to sustain her milk production, only a small proportion of those calves are needed to maintain the numbers in a stable dairy herd. The rest become beef cattle. Using artificial insemination, farmers can ensure that the paternal genes of most of these beef calves are from a beef bull, but the calves' maternal genes are still "dairy." With embryo transfer, a dairy cow can be a surrogate mother to one or two 100-percent all-beef calves. Since about 60

percent of U.K. beef cattle are the offspring of dairy cows, the new technique has considerable attractions to the farmer as long as there is sufficient consumer demand for high-quality beef.

The company, which was backed earlier this year to the tune of \$1 million by Biotechnology Investments Ltd. (Guernsey, Channel Islands, U.K.)—N. M. Rothschild's biotechnology fund—expects to derive considerable income from the frozen embryos. They will be sold through the Milk Marketing Board and the newly-formed Scottish Beef Developments Ltd. (Aberdeen, Scotland) at about \$70 a pair, including implantation.

Production line oocytes and embryos will also provide the opportunity to produce transgenic animals in large enough quantities for the farm, says Polge, who is a fellow of the Royal Society. However, he cautions, although the feasibility of producing proteins of pharmaceutical value in the milk of transgenic sheep has already been shown, the transfer of the technology into the farmyard is "a long way off." —Peter Newmark

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