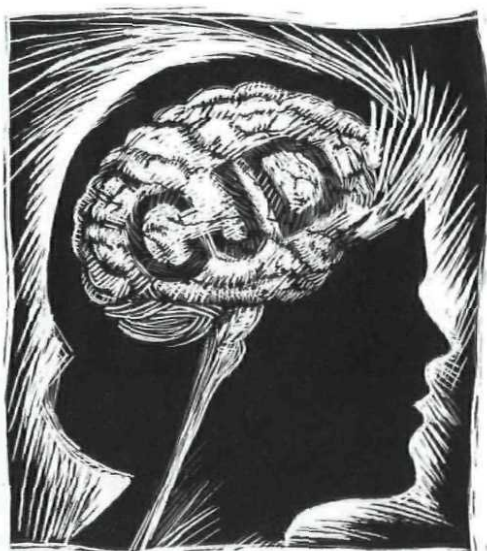


TRENDS & Ideas

NEUROLOGY

Outlook Improves for Rare Disease



New-variant Creutzfeldt-Jakob disease (nvCJD) is becoming a more familiar term, but it is still far less recognizable than its more colorful bovine equivalent, "mad cow disease." The latter disease is incurable and fatal both to cows and humans, although a study reported in *The Economist* suggests that therapy for it may someday be possible.

In the past, the disease was usually communicated from cow to cow through the now-banned practice of mixing cow bone meal into cattle feed; it was communicated most often to humans through the ingestion of tainted beef. Despite public awareness campaigns, it is still a difficult disease to

track. Its symptoms surface gradually over a period of years and can be reliably diagnosed only after death.

Two different manifestations of the same disease, "Mad cow" and nvCJD are both caused by the ingestion of a *prion*, a misfolded, defective protein.

A protein's function is intricately tied to its unique shape and composition, and a folding error most often creates an inert molecule. Prions cause disease by catalyzing other proteins to misfold as well. As prions accumulate and normal protein manufacture declines, the effects begin to mimic a viral infection. Because CJD acts on the brain, attempts to either prevent

BIOTECHNOLOGY

Pathogenically Grown Embryos on the Horizon

Despite their revolutionary promise for medical treatments, embryonic stem cells raise very difficult ethical questions. Harvesting such cells, which can be encouraged to change into any type of specific human tissue, requires the destruction of a human embryo.

Scientists in Los Angeles and Massachusetts are working on another option, according to the *Los Angeles Times*. They are developing ways to force an unfertilized egg cell to grow and produce stem cells. The phenomenon is called "parthenogenesis." The resulting embryo is incapable of growing into a human being. Jerry Hall, a researcher at the Los Angeles-based Tyler Medical Clinic, believes the technique "simplifies the moral situation tremendously. . . . Because this embryo lacks the potential to become a child, that implies that it doesn't have the same status as a normal embryo."

Nearly a century ago, research with sea urchins revealed that egg cells would begin dividing on their own when given the proper chemical or electrical stimulus.

Researchers working with mouse embryos have been able to sustain them long enough for stem cells to form. Those embryos self-destruct after several weeks. The researchers believe that human embryos treated the same way will do the same.

A spokesperson for the U.S. Conference of Catholic Bishops said it was unclear whether the church would view pathogenically grown embryos as a form of human life deserving protection.

Unfertilized embryos are only one tactic in a broad effort to derive the benefits from stem cells while raising fewer ethical questions. Massachusetts-based Advanced Cell Technology is sponsoring adult stem-cell research in which adult cells are harvested and egg cell proteins are used to force the cells to revert to an embryonic state. In testimony before a U.S. Senate committee, Michael West, the firm's CEO, stated that these cells "would not have the architecture of an embryo and would not create a pregnancy if put into a uterus."

or correct the misfolding with drug therapy are limited in effectiveness. Despite promising lab results, many drugs are unable to cross the blood-brain barrier that protects the brain from foreign chemicals.

One new approach is to test drugs previously used in the treatment of brain diseases and are thus known to be capable of crossing the blood-brain barrier. Dr. Stanley Prusiner, of the University of California-San

Francisco, and his colleagues have determined that quinacrine, a malaria drug, and the schizophrenia drug chlorpromazine inhibited the formation of misfolded proteins in cultured cells. These drugs also seem to clear away misfolded proteins already present.

Bruce Miller, a fellow researcher at UCSF, has begun administering the drugs to two patients whose symptoms probably indicate nvCJD (an exact diagnosis

requires an autopsy). Anecdotal reports indicate that one woman has regained enough physical coordination to walk again. Clinical trials of the drugs were set to begin this fall, and Britain's National CJD Surveillance Unit has announced that it will be contacting six other suspected victims to inform them of the research.

ENDANGERED SPECIES

Surrogate Parents in the Animal Kingdom

Betsy Dresser has a new pet—an endangered African wildcat. Dresser's efforts as director of the Audubon Center for Research of Endangered Species, New Orleans, are the reason the wildcat is more than an embryo frozen in liquid nitrogen.

Dresser is a leading voice for research intended to avert animal extinctions through cloning and advanced reproductive techniques, according to an article in *Discover*. The African wildcat, named Jazz, was born from an embryo implanted in the womb of a domestic housecat. It was produced from stores of material—sperm, embryos, tissue samples—that Dresser has been collecting since the 1980s.

Interspecies surrogacy appeals to biologists for several reasons. Mothers from the endangered species may be too rare or not available for research. Surrogate mothers from species such as cats, sheep, antelope, and cows are often easier to come by in sufficient numbers.

In addition, new cloning techniques are being developed for the benefit of endangered species. Normal adult-cell cloning relies on cellular DNA that is introduced into an egg cell from that species. Endangered species' egg cells are rare, primarily because they don't store well frozen, unlike sperm cells. The scarcity necessitates the use of an egg

cell from a foreign species, which can then be implanted into the womb of the surrogate mother.

Other biologists are critical of the project. They argue that publicity over a few notable successes obscures the fact that the reproductive techniques are years away from showing any measure of reliability, efficiency, or cost-effectiveness. David Wildt, head of reproductive sciences at the National Conservation and Research Center, Washington, DC, compares the research to the now vital artificial insemination used to captive-breed cheetahs, black-footed ferrets, and giant pandas. These programs became useful only



after scientists spent years studying each animal's unique reproductive mechanisms. "We learned that cheetahs are not cows," said Wildt. He is also concerned that surrogate breeding programs cannot rescue thousands of other endangered vertebrate species. A handful of individuals cannot create a self-sustaining gene pool, he maintains.

Biologists defend the program by envisioning a frozen zoo, where thousands of samples from many different species are preserved for a time when cloning techniques are more advanced. "They take a second look at it when they realize we're not talking about . . . a genetic bottleneck," said Phil Damiani of Advanced Cell Technology, a Massachusetts firm.

SPIRITUAL HEALTH

Another Study Cites Power of Religion in Healing

A widely held notion states that religious faith speeds healing. A recent study published in the *Journal of Holistic Nursing* indicated that the majority of their sample group of older adults used prayer as a complement or alternative to medical treatment. According to a new study in *Archives of Internal Medicine*, as reported in *The New York Times*, the questioning of one's faith can actually prove detrimental to recovery.

The latter survey looked at 596 elderly hospitalized patients and found that those who "wondered whether God had abandoned me," "questioned God's love," or blamed their condition on "the devil" were more likely to have died within two years. Patients in the study were mostly Christians, with the majority representing moderate to conservative Protestant denominations.

"We know from quite a bit of research that religion can be a potent resource," said Dr. Kenneth Pargament, the study's lead author. "It can be a source of solutions but it can also be a source of problems . . .



It's also clear that religion has a darker side."

Other scientists are not convinced. The number of patients surveyed is quite small in comparison to the subjects of faith-benefit studies, they say, and the causes of death could not easily be determined. More than 150 patients could not be located, even though their omission brought the statistical reliability of the study into question. "With a tiny effect like this, you have to be very cautious about bias," stated Dr. David Freeman of the University of California-Berkeley, who reviewed the study.

Pargament was quick to portray the findings as less fearful than they seemed. "From Moses to Jesus to Buddha, you see religious figures going through dark nights of the soul, and through that process they come out steeled and strengthened." His co-author, Harold Koenig, agreed. "All these are normal feelings, but people work through them usually, and people who can't . . . are going to have worse health outcomes."

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