



## CHIMERAS TO NANOTECHNOLOGY: SCIENCE SEEKS TO IMPROVE HUMANS

*"And He is before all things, and in Him all things hold together." Colossians 1:17*

In ancient times man sought to make "a name for himself"; collaborating on the Tower of Babel, a tower that was to reach into heaven, supposedly to supplant God from His throne or at least obtain access without having to rely on His good will. That plan was foiled when God confused man's language and "Hand me another brick" became gibberish. In modern times man has begun again collaborating by using science, the computer and his own ingenuity to "create" life, to map the human genome, the messaging system our body uses to express our uniqueness in the universe, and to send men to outer space and bring them back. Debates in legislatures have expanded into discussions about chimeras, cloning of embryos to genetic technology in agricultural products. Clearly times have changed and all of us are desperately trying to keep up with the latest technology. I have emerged from the land of the blinking VCR to DVDs, MP3 players, flat screen televisions and many more new advances that I don't have to time to learn how to use. Just when I thought I had my Palm Pilot mastered, now I have to learn how to use a Blackberry or the most recent advance sure to give me lots more time – time to read books on how to operate the blamed things.

### Troubling clouds on the horizon

Some of the advancing technology is not trivial and will pose grave problems for legislatures, policy makers and ethicists in the future. There were bills debated this year in the Kansas Legislature in which human cloning would be banned and the creation of chimeras would be banned. Both measures failed with legislators saying they did not know enough about this technology. Not knowing enough is not good enough. By the time they and we get up to speed it could be too late for the human race.

### Chimeras are made not born

The name chimera comes from a Greek mythological creature with a lion's head, a goat's body and a serpent's tail. A chimera is defined as an animal with two or more different populations of cells. They are formed from either four parent cells (two fertilized eggs or early embryos are fused together) or three parent cells (a fertilized egg is fused with an unfertilized egg or a fertilized egg is fused with an extra sperm). Each population of cells keeps its own character and the resulting animal is a mosaic of mismatched parts. An analogy would be two puzzles that are cut exactly alike but with parts of two different pictures. In biological research, chimeras are produced by mixing cells from two different organisms. This can result in the development of an adult animal composed of cells from both donors which can be from different species.

### Examples

Examples include a creature called a geep that was created by combining embryos from a goat and a sheep. This was done in 1984, so the idea is not new. In fact rat/mouse chimeras and rabbit/human chimeras have been made. In August 2003

researchers in China reported that they had fused human skin cells and rabbit eggs to produce the first chimerical human embryos. In Minnesota, pigs are being born with human blood in their veins. In Nevada, there are sheep whose livers and hearts are largely human. In California, mice are being bred with human brain cells. In fact, Stanford University's Irving Weissman has stated that he may soon fabricate a mouse that would have a human brain, to build on the mouse he has already created with millions of human brain cells (1 percent). The manipulated creatures look, act and smell like animals but their cellular machinery conceals other biochemical capabilities. The mice would be injected with human neurons into the brains of embryonic mice. The mice would be killed and dissected before birth to see if a human brain had formed. If that is determined then Weissman would look for human cognitive ability. He wants to see how the human brain works – ostensibly to help Alzheimer's and Parkinson patients.

### Some objections

William Chesire, associate professor of neurology at the Mayo Clinic's Jacksonville Florida branch states, "This is unexplored biologic territory. Whatever moral threshold of human neural development we might choose to set as the limit for such an experiment there would be considerable risk of exceeding that limit before it could be recognized." He went on to state in an article from the *National Geographic News* January 25, 2005, "We must be cautious not to violate the integrity of humanity or of animal life over which we have a stewardship responsibility. Research projects that create human-animal chimeras risk disturbing fragile ecosystems, endanger health, and affront species integrity."

### Useful applications

Some types of this technology can be useful and helpful to mankind. A medical technique that has been in existence for years that combines human and animal tissue is the use of pig valves in human hearts.

### Limits

Many scientists believe that science can combine species without danger of contaminating the food supply or disturbing human dignity as long as there are limits on the number of human cells that are placed into animal embryos. Weissman, on the other hand states, "Anybody who puts their own moral guidance in the way of this biomedical science, where they want to impose their will – not just be part of an argument – if that leads to a ban or moratorium – they are stopping research that could save human lives."

### Hand me another brick

The argument will continue to grow as more and more techniques become available to scientists – more and more bricks to build that tower to the heavens. Our legislators will be asked to place those restrictions on those who propose experiments that remind us of the Frankenstein monster. Science would like to be able to do whatever it can; but we have to decide whether or not that is our best interest.

More in the next *Family Concerns*