



IBT researcher looks for genetic clues to spina bifida.

January 28, 1998

Mice with altered genes may provide the clues medical researchers need to begin solving the riddle of spina bifida. Scientists at Texas A&M University's Institute of Biosciences and Technology in Houston are studying mice whose DNA contain mutations, or changes, that produce symptoms that mimic human spina bifida.

Dr. James F. Martin, a physician and molecular biologist at IBT, believes the genetically altered mice may help medical scientists begin to understand the role genetics plays in this crippling disease. Almost five in every 10,000 babies are born with spina bifida, a crippling birth defect that often leaves its victims paralyzed and confined to wheelchairs. In the United States, about 1,500 infants are born each year with the disease, according to the federal Centers for Disease Control and Prevention. Medical care for children and adults with spina bifida costs more than \$200 billion a year.

Normally, a sheath called the spinal canal surrounds the spinal cord as it develops in the growing fetus. Later, the bones of the spine form around the spinal canal. Spina bifida occurs when a gap is left in the protective sheath. In mild cases, the defect often has no noticeable effect on the child. In severe cases, however, children may be paralyzed. Neurological damage also may occur. Spina bifida can be detected before birth, but at present, there is no medical or surgical treatment for it.

Researchers are investigating possible surgery to correct the defect before the fetus is born, but Martin is looking into the role that a gene identified at *prx-1* may play in the development of the spinal cord and spine. In earlier work, he found that mice in which the *prx-1* gene didn't function were born with defects in the bones of the skull and face. About 15 percent of them also had spina bifida.

Now, working with funding from the March of Dimes Birth Defects Division, Martin is investigating whether *prx-1* and another gene, *pax-3*, may be working together in some way to control development of the spine and spinal cord, especially the closing of the spinal canal. To do this, he is producing mice that carry mutations of both the *prx-1* and *pax-3* genes. By analyzing these so-called compound mutant mice, he hopes to discover whether the two genes regulate the same processes during spinal development.

In addition, because analysis of animal models for spina bifida have shown that abnormal cell proliferation and cell death can result in the disease, he is also looking for alterations in these cellular processes in *prx-1* mutant mice. The researchers hope that better understanding the genes' roles in the development of the neural tube and spine will one day give physicians tools, such as gene therapy, to prevent or treat the disease.