Fishing for embryo émigrés

One of the greatest mysteries in the embryological development of vertebrates is the coordinated movement of cells to form functional organs—particularly the motion of neurons to properly constitute the developing brain and spinal cord. To analyze such complex systems, the appropriate model animal, not mere cell or tissue culture, is ultimately required. Currently, the Trans-NIH Zebrafish Initiative is under way to accomplish the complete sequencing of the zebrafish genome. Comparisons of zebrafish and mammalian gene maps have revealed extensive conservation among vertebrates, and mammalian counterparts for all zebrafish chromosomes have been identified. Thus, researchers at Vanderbilt University (Nashville, TN) and the University of Missouri (Columbia) have turned to zebrafish for the answers. Recently, Jason Jessen and colleagues reported their studies on a series of mutations known as *trilobite* (*tri*), which affect gastrulation and neuronal movements in developing zebrafish embryos (*Nature Cell Biol.* **2002,** *4,* 610–615).

The *tri* phenotype consists of a relatively disorganized embryo formation resulting in a classic trilobite shape. These mutations all were determined through sequence analysis to be changes in the zebrafish homologue of the gene for a transmembrane protein known as Strabismus/Van Gogh (*stbm*). The protein was previously found in *Drosophila* to be a modulator of planar cell polarity—the localization of cells in defined and correct regions of the developing embryo.

To determine the physiological function of the protein in zebrafish, the researchers used a series of RNA complementation and cell transplant experiments. Injection of wild-type *stbm* RNA into *tri* zebrafish, for example, was capable of restoring correct motor neuron migration 33% of the time. Conversely, injection of antisense *stbm* morpholino oligonucleotides into wild-type cells, which will disrupt gene expression, led to mild symptoms of the *tri* phenotype in 95% of wild-type embryos.

Ultimately, the researchers showed that the disruption of neural migration in *tri* mutants was due to the slowing and randomization of the amoeba-like movement of the neurons by the late gastrulation stage as compared to wild-type. Transplanted *tri* neurons placed into wild-type embryos showed no reversion to wild-type behavior, indicating that the aberrant behavior of the protein had an internal cellular component. However, as wild-type neurons transplanted into *tri* embryos did not elongate and align correctly, this was considered an indication that the aberrant protein also disrupted intercellular neuron communication. Knowledge of the function and mechanism of such proteins as Strabismus/Van Gogh may have long-term benefits in understanding various developmental diseases.

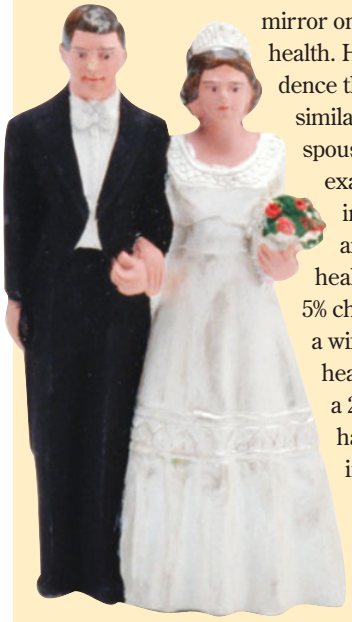
—MARK S. LESNEY

PHOTO: PHOTODISC

In sickness and in health

The old saying that husband and wife start to look alike after a few years of marriage seems to also apply to their medical charts. According to a study conducted by Brigham Young University (Provo, UT) professor of political science Sven Wilson, there is a distinct connection between the health of a person and that of his or her spouse.

Wilson obtained lifestyle and demographic information from a nationwide Health and Retirement Study done in 1992. The data came from more than 4700 couples, and Wilson used it to test the idea that married people mirror one another's health. He found evidence that indicated similarities in the spousal pairs. For example, a man in his early 50s and in excellent health has about a 5% chance of having a wife in only fair health and only a 2% chance of having a wife in poor health. Similarly, a man in poor health had a 24% chance of being married to a woman in only fair health and a 13% chance of being married to a woman in poor health.



Wilson proposes that the parallel in health backgrounds stems from the fact that people tend to choose spouses with comparable educational and economic status, commonly suggested predictors of health status. Also, the lifestyle decisions that are made by couples after they are married, such as those regarding smoking, drinking, and diet often foretell their future health condition.

In addition, Wilson suspects that there are other causes for similarities that were not found in the data he studied. Those causes include environmental risks such as breathing the same air and being exposed to the same germs. Another factor is that spouses often deal with the same stresses, including problems with children and financial worries.

Wilson said that he hopes his study will prompt physicians and policy makers to focus on the health of families, rather than individuals. "When spouses find themselves both in poor health, they each lack the support a healthy spouse would provide, and both face the additional stress of dealing with the sick loved one," said Wilson. "In these cases, two sick spouses add up to a serious drain on the financial and other resources of the family and the public."

—FELICIA M. WILLIS

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