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PROTEIN REQUIRED TO FORM NERVOUS SYSTEMS IN FROGS COULD PROVIDE IMPORTANT CLUE TO HUMAN DEVELOPMENT

DALLAS – June 7, 2002 – Researchers at UT Southwestern Medical Center at Dallas have discovered that a certain protein is required for neurological development in frogs, a finding that could advance scientists' understanding of human development.

The work, published in today's edition of *Developmental Cell*, was conducted in the lab of Dr. Jonathan M. Graff, assistant professor in the Center for Developmental Biology and senior author of the paper. Graff's team reports that when the protein Smad10 is absent from frog embryos, the tadpoles that develop never form nervous systems.

Smad10 is a member of a family of proteins that act as signal carriers between cells. When Smad10 was absent from the frog embryos, the chemical signals that program stem cells to form nerve tissue apparently could not be relayed.

"This could potentially be important for human disease," Graff said. "Frogs are a classic model."

The research will lead to further understanding of how the human nervous system, including the brain and spinal cord, develops and why it doesn't repair itself. But it also could apply to a broader understanding of how unprogrammed stem cells are formatted for specific purposes throughout the body, Graff said. That could help scientists and doctors understand and combat certain diseases, as well as lead to new ways to repair physical damage to the body.

Graff said the Smad10 finding builds on neural induction research dating back nearly 100 years. In the early 1900s, German scientists Hans Spemann and Hilde Mangold discovered that tissue transplanted from frog embryos' backs to their bellies caused cells around the transplant areas to form complete nervous systems. The cells that formed the misplaced nervous systems would have developed into skin cells under normal circumstances.

(MORE)

Those experiments led to a theory that an unidentified agent produced by the transplanted tissue chemically directed the cells to form nerve tissue rather than skin. Researchers have been working since to identify that agent. While it is unlikely that a single mechanism controls the process, the Smad10 findings expose a key element in the process that Spemann and Mangold revealed, Graff said.

Dr. James A. LeSueur, a former graduate student in the Center for Developmental Biology, was the lead author of the study. Other contributors, both from the Center for Developmental Biology, were Edgardo S. Fortuno III, a graduate student, and Dr. Renée M. McKay, a postdoctoral research fellow.

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