Cell pathway, disease linked to histone action

October 26 2007

University of Alabama at Birmingham (UAB) researchers have discovered a key cell-signaling pathway that regulates cell progression and switches on front-to-back body patterning in tadpoles.

Uncovering this signaling pathway will greatly assist scientists in understanding the complex DNA and cell interplay that leads to abnormal cell growth, a hallmark of cancer and other diseases.

The UAB team focused on the pathway that led to deregulation of a protein called H2A and how those changes influenced cell growth. The results are published in the journal *Nature*.

H2A is a part of a class of proteins called histones, which hold their own code for how the genetic DNA inside cells is used to form tissues, bones and other structures. In the *Nature* study, a protein was identified that modifies H2A, which in turn regulates normal cell pathways and cell growth.

When the function of this protein was blocked in tadpole embryos, the front-to-back body patterning that happens as they mature was altered, said Hengbin Wang, Ph.D., an assistant professor in the UAB Department of Biochemistry and Molecular Genetics and lead author on the study.

Wang said the findings show potential in future research to identify biochemical agents or drugs that can target histones and influence cell production.

Earlier research has looked at whether targeting histones during certain times of biological development will effectively 'switch on or off' certain pathways or patterning signals. Putting our finger on this switch would give geneticists, doctors and biochemists unprecedented control in stopping tumor growth and other human diseases, Wang said.

"This finding goes along way toward helping us understand how histones like H2A are modified in the cell cycle and what that means for normal or abnormal physiological growth," he said.

"One thing we know for sure is that modifying histones is very important to chromatin structure and function," he said. Chromatin is the DNA and protein mixture that makes up chromosomes, the threadlike structures inside cells that are necessary for reproduction.

Source: University of Alabama at Birmingham