



PRESS RELEASE

**Embryonic Development Research Bolstered with
\$111,900 Children's Guild grant made to HWI, Dr. Timothy Umland**

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The Children's Guild has made an \$111,900 grant to Dr. Timothy Umland of Hauptman-Woodward Medical Research Institute to support his work on embryonic development. The two-year funding grant will be used specifically in the study of mutant Hox genes and their impact on developmental and childhood diseases.

"The Children's Guild grant support is a tremendous contribution to enable us to undertake this important research on how Hox proteins impact embryonic development," Umland, HWI research scientist, said. The study is entitled "A Molecular View of Morphogenesis: Structure- Function Studies of the Hox Transcription Factor and Family & Associated Cofactors."

Hox proteins are classified as master regulators of cellular differentiation and proliferation and are key factors in embryonic development. When the Hox proteins aren't working right, it can cause a number of problems: the embryo may not be viable; it can cause extra fingers or toes; it may result in central nervous problems; it may negatively affect organ development; it can lead to limbs that are an incorrect length or placed in the wrong area of the body, and so on.

"There are two primary issues to gaining a more broad understanding of this issue. We want to have a better understanding of how Hox proteins bind to certain specific DNA sequences and not other very similar sequences contained within the human genome. This results in the Hox proteins' ability to turn target genes on or off at specific points in time during development. Hox proteins interact with a variety of other proteins called cofactors. Different combinations of Hox proteins and cofactors yield different DNA-binding specificities. We need to solve the crystal structures of these various combinations bound to DNA to see at the atomic level how these important Hox-cofactor interactions with specific DNA sequences occur, and how mutations will change these interactions and result in developmental irregularities.

"The second part is that some of the Hox cofactors have important interactions with other Hox cofactors in the absence of Hox, and some of these cofactor complexes are also capable of binding to DNA. Depending on how the various components are mixed and matched, you can get different results," Umland said. "If we can gain a greater understanding of how the various combinations are able at a molecular level to turn different genes on and off, we will be in a better position to also understand where things may be going wrong."

Celebrating 50 years of exceptional scientific research, HWI is an independent, non-profit facility specializing in the area of fundamental biomedical research known as structural biology. Our team of more than 70 staff members is committed to improving human health by studying the causes of diseases, as well as potential therapies, at their basic molecular level. We are located in the heart of the Buffalo Niagara Medical Campus in downtown Buffalo, New York, in a new state-of-the-art structural biology research center at 700 Ellicott Street. For more information, visit HWI's website at <http://www.hwi.buffalo.edu> or call 716-898-8600.

