

THE HARTWELL FOUNDATION

2006 Individual Biomedical Research Award

Frederic G. Barr, MD, Ph.D.

**Assistant Professor
Department of Pathology and Laboratory Medicine**

University of Pennsylvania



**Role of Overexpressed MicroRNA's in the Pediatric Cancer
Alveolar Rhabdomyosarcoma**

RNA is a chemical relative of DNA found in the nucleus and cytoplasm of all cells. Many types of RNA play a role in the process of protein synthesis, known as translation. Discovered only recently, microRNA (miRNA) derives from a smaller, single strand of RNA and play a role in gene regulation by interfering exclusively with the production of proteins, by enhancing or inhibiting the translation of target messenger RNA (including promoting degradation of messenger RNA). Only about 1000 miRNA exist compared to the 25,000 or so genes (DNA segments) in the human genome. Inappropriate expression of a mutated gene or inactivation of a tumor suppressor gene can contribute to cancer. In this regard, it appears that changes in the levels of miRNA may alter the control of growth or apoptosis (cell death) of some cancers. Working with an innovative human cell culture system where myoblast cells convert to a pediatric cancer called alveolar rhabdomyosarcoma (ARMS), Dr. Barr has observed the presence high levels of certain miRNA. He proposes to use this model system to study the genetic steps in ARMS, the effects of these particular miRNA on ARMS tumor development, and the effect of drugs that block the effect of such miRNA. If successful, his results would not only establish the importance of miRNA in this cancer, but also possibly reveal potential drug targets for intervention therapy. Today in the US, the 5-yr survival rate for the approximately 350 new cases each year of pediatric rhabdomyosarcoma is only about 64%.