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My Sarnoff Fellowship experience under the tutelage of Drs. Tom Quertermous and Ken Bloch played a pivotal role in directing me toward a career in cardiovascular research. Currently, I am currently a physician-scientist at Vanderbilt University School of Medicine, where I split my time between basic science research, teaching, and the care of patients with inherited cardiovascular diseases. The major theme of my laboratory's research is chemical genomics of vertebrate development. In a manner analogous to the classic forward mutagenesis screens, we conduct high-throughput chemical screens in zebrafish for small molecules that specifically perturb embryonic pattern formation. Since some of these compounds will function by promoting development of specific tissue types, an important goal of our research is to develop chemical tools for stem cell research and regenerative medicine. Moreover, since aberrant activities of many developmental pathways play a major role in pathogenesis of variety of postnatal diseases, such as cancer, compounds that modulate them show promise as lead compounds for treatment of variety of human diseases. Using this interdisciplinary approach, we have thus far discovered potent and highly selective chemical modifiers of bone morphogenetic protein (BMP), Wnt, NF- κ B, and Hedgehog pathways. In addition, we have identified novel signaling components that appear to be critical for the establishment of the embryonic body pattern. The first BMP inhibitor, which we named dorsomorphin, has been successfully used to induce cardiomyogenesis and neurogenesis in embryonic stem (ES) cells, and to evaluate the therapeutic potential of BMP inhibitors for heterotopic ossification syndromes and anemia of chronic inflammation.

Selected Reference:

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