NIH Award from the National Heart, Lung, and Blood Institute

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- **Project:** Therapeutic Angiogenesis in Vascular Medicine III
- **Start Date:** July 1, 2009
- **Total Award Amount:** $455,842

**How the results of this project will benefit society:**
Impairment of peripheral nerve function leads to significant disability. The repair and regeneration of injured nerves involves coordinated growth of new vessels and new nerve tissue. This application seeks to extend our preliminary investigations into the role of the hedgehog signaling pathway, one of the key regulators of animal development, during functional nerve recovery and to evaluate the potential use of a protein known as sonic hedgehog for accelerating the repair of injured nerves.

**The problem the project is trying to solve:**
Injured tissue needs neovascularization or the growth of new blood vessels for its regeneration. Our preliminary data indicate that repair of injured nerves is accompanied by active growth or restoration of the blood supply of the nerves. The growth of new vessels, commonly known as angiogenesis, appears to be a critical component of the healing process of nerves. Our preliminary studies also indicate that sonic hedgehog, a protein previously thought to be important primarily during embryonic life, is also capable of participating in the repair of damaged or ischemic tissues, including nerves. The effect of sonic hedgehog appears to be mediated in part by the restoration of blood vessels which supply nerves, but may also involve effects on endothelial progenitor cells that contribute not only to new blood vessel growth, but perhaps also to the reconstitution of the nerve tissue itself.

**How this project will work:**
We will investigate the potential for sonic hedgehog to improve the neovascularization and thereby the healing process of injured nerves and will investigate some of the underlying mechanisms responsible for these effects. Our preliminary data suggests that this may represent a novel therapeutic approach for accelerating recovery of damaged peripheral nerves. Accordingly, these studies will provide basic mechanistic insights, as well as insights into potentially important new therapeutics.

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