Targeting microRNAs as a Treatment for Vascular Disease

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Technology description

Summary
Vanderbilt researchers have identified a highly expressed microRNA crucial in angiotensin induced hypertension; and developed a therapeutic strategy that focuses on local or systemic administration of antisense microRNA to inhibit microRNA expression as treatment for vascular diseases. Promising data in animal models reveals that the inhibition of such microRNA not only prevents fibrosis but also reverses previously established aortic stiffening.
Addressed Need
Hypertension is a major risk factor that affects about 1 in 3 adults in America. This disease has been associated with increased fibrosis due to excess accumulation of collagen in blood vessels causing high blood pressure. Current treatments for hypertension and other fibrotic diseases like interstitial pulmonary fibrosis, keloids and hypertrophic scars are often unsuccessful and require multiple agents. The antisense microRNA therapeutic strategy provides an effective approach that can be used as a single agent or in combination for the treatment of multiple fibrotic diseases. In addition, this therapy can be used to coat intravascular medical devices to prevent localized tissue fibrosis.
Figure. Masson’ s trichrome staining of mice aortas infused with Angio-tensin II and co-treated with PBS or antisense microRNA shows that microRNA inhibition prevents the accumulation of collagen (blue).

Advantages

- Systemic or local administration of anti-microRNA
- Coating of intravascular stent or balloon angioplasty
- Antisense miRNA topical cream for keloid and hypertrophic scar treatment
- Aerosol miRNA inhibitor administration for pulmonary fibrosis treatment

Institution

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