VCU Innovation Gateway
Office of the Vice President for Research and Innovation

Treatment of Atherosclerosis

Nanoparticle Delivery of Targeted Pharmaceutical and Gene Therapy Treatments for Reduction of Cholesterol

Cardiovascular disease (CVD) continues to be one of the leading causes of morbidity and mortality in most parts of the world, number one in U.S. Although there are invasive approaches to limit plaque buildup, there are no non-surgical techniques that completely remove cholesterol from the body. Researchers from VCU have developed a novel nanoparticle system that uses a surface targeted approach to regress CVD by delivering anti-atherogenic agents.

The technology

The therapeutic specifically targets macrophage foam cells and delivers anti-atherogenic agents, either a targeted ligand or a targeted gene therapy, both of which act on the CEH gene to enhance the removal of cholesterol. This approach is non-toxic and allows removal of cholesterol without invasive procedures. Further, this invention is a disruptive approach, which allows the reversal and removal of plaque buildup throughout a lifetime as shown in Figure 1. Importantly, the delivery method allows for a targeted approach to the treatment of atherosclerosis, allowing delivery of the therapeutics to the macrophage foam cells responsible for the cholesterol mobilization.

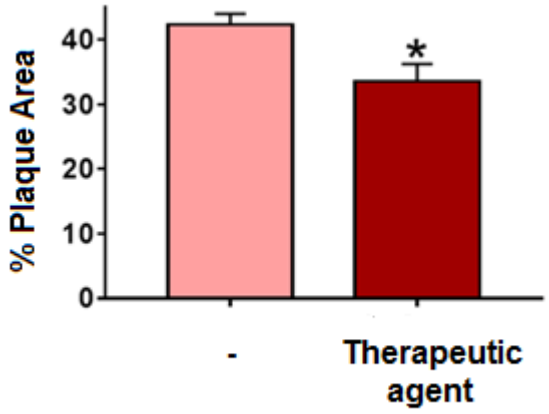

Figure 1. *Results of decreasing plaque area in vivo by using the targeted therapeutic approach to deliver anti-atherogenic agents. Following a 4 week treatment period, there is a significant decrease in plaque area within the aortic root of mice.*

Benefits

- Non-toxic formulation
- Removes cholesterol without surgical intervention
- Both pharmaceutical and gene therapy deliverable therapeutics
- Targeted delivery of anti-atherosclerotic agents

Applications

- Treatment of atherosclerosis
- Removal of cholesterol from body
- Decrease plaque build-up in vessel walls

Patent status:
Patent pending: U.S. and foreign rights are available.

License status:
This technology is available for licensing to industry for further development and commercialization.

Category:
Biomedical

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Investigators:
Hu Yang, Ph.D.
Shobha Ghosh, Ph.D.
Hongliang He, Ph.D.
Michael Lancina

Contact us about this technology

Brent Fagg, MS
Licensing Associate
bfagg@vcu.edu
(804) 827-2211