

Antiatherogenic Gene Therapy

Reversing cholesterol transport & reducing plaque

Cardiovascular disease (CVD) continues to be the leading causes of morbidity and mortality in many parts of the world, including the U.S. The most common cause of CVD is atherosclerosis, which is characterized by the deposition of cholesteryl ester (CE)-laden macrophage foam cells in the arterial wall. Current treatments mainly focus on limiting further CE accumulation by restricting cholesterol intake and reducing endogenous synthesis of cholesterol in the liver. However, without surgery there is no method for enhancing the removal of CE from the body via the liver. VCU researchers have aimed to fill this need by developing a novel system which targets macrophage foam cells to enhance reversed cholesterol transport and reduce atherosclerosis plaques.

The technology

This therapeutic specifically targets macrophage foam cells or hepatocytes in the liver to deliver cholesteryl ester hydrolase (CEH). CEH allows for the hydrolysis of CE and is able to enhance the removal of free cholesterol. This reduces the lipid burden in the existing plaque which causes CVD, and is also able to enhance plaque stability which would reduce the occurrence of acute coronary events. This therapeutic has been found to not be immunotoxic and also did not induce either hepatic or renal toxicity.

In vitro and *in vivo* data are available.

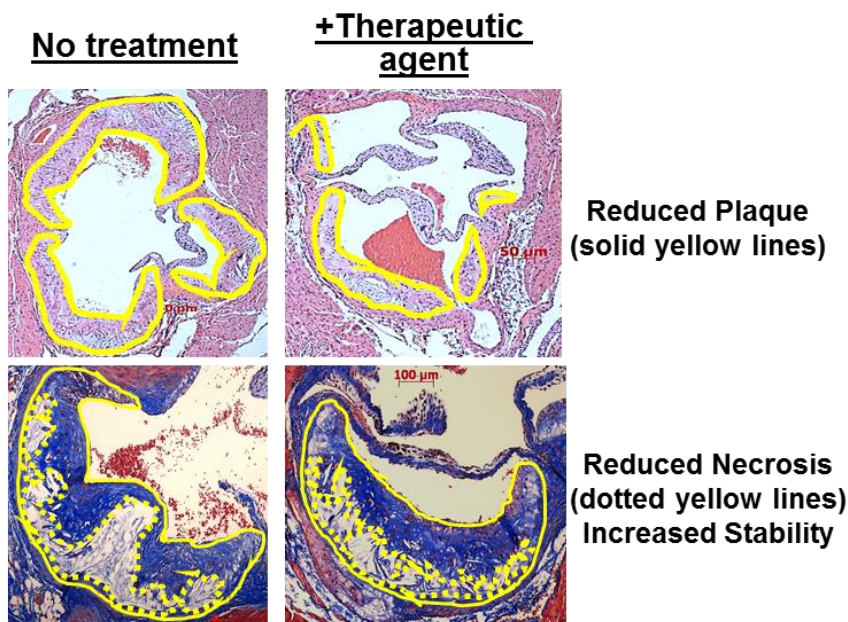


Figure 1. *LDLR*^{-/-} mice were fed a Western-type high-fat high-cholesterol diet for 12 weeks and divided into 2 experimental groups. It was found that the treated group not only had a reduced plaque area, but there was also a decrease in the necrotic areas within an individual plaque.

Benefits

- » Removes plaque build-up
- » Prevents plaque accumulation
- » Non-surgical method
- » Non-immunotoxic

Applications

- » Treatment of atherosclerosis

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

VCU Tech #:

16-082F, 16-088F

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[He, Hongliang, et al. \(2017\)](#)

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