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# Galectin-9: A new target for beating atherosclerosis?

Atherosclerosis is a chronic medical condition characterised by the accumulation of fat in the walls of blood vessels, which obstruct the normal flow of oxygen-rich blood and can have severe health consequences. Peripheral arterial disease (PAD) is a type of atherosclerosis that primarily affects the arteries in the legs. When atherosclerosis occurs, immune cells attempt to eliminate the fat build-up by triggering an inflammatory response. However, these immune cells can become trapped within the fatty plaques, where they release chemical signals that attract more immune cells to join them. This leads to a vicious cycle of escalating inflammation, further damage to the blood vessels, and an increasing number of immune cells entering the plaques.

Lifestyle-related factors, such as smoking, high stress levels, and poor dietary choices, are significant contributors to the development of atherosclerosis. Unfortunately, there is currently no specific treatment or preventive medicine that can effectively reverse or stop the progression of this disease. As atherosclerosis advances, it significantly raises the risk of life-threatening events like heart attacks or strokes.

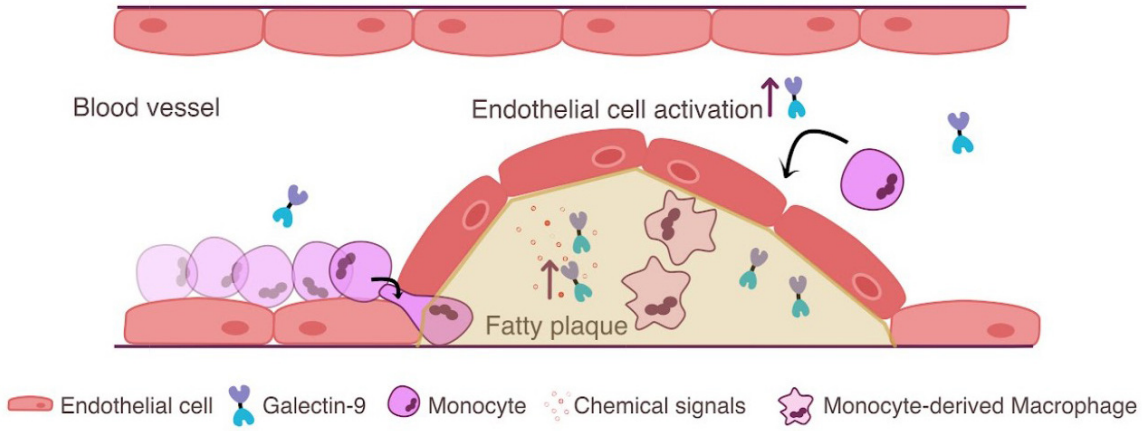


Fig. 1. Galectin-9 promotes the build-up of white blood cells within fatty plaques in the blood vessel. Endothelial cells that line the blood vessels are a source of galectin-9, which attracts white blood cells (monocytes) from the bloodstream and into the plaque. Once inside the plaque, monocytes change into macrophages that express high levels of galectin-9. This extra galectin-9 brings more white blood cells into the plaque, causing it to get larger and more inflamed, overall making atherosclerosis worse.

Researchers have identified a key immune protein called galectin-9 as a significant contributor to the inflammatory processes driving atherosclerosis. Galectin-9 represents a promising target for potential therapies aimed at treating the condition.

In the research study, mice were subjected to a high-fat diet for 12 weeks. The results were striking: the mice unable to express galectin-9 had significantly smaller areas of fat build-up in their blood vessels compared to the control mice able to produce this protein. This suggests that galectin-9 plays a role in the development of fat plaques in the context of diet-related atherosclerosis.

Further analysis of the contents of these fatty plaques revealed that a specific type of immune cell, originating from monocytes and known as macrophages, expressed high levels of galectin-9. When galectin-9 levels rise, macrophages release chemical signals (e.g., TNFα, IL-6). These signals promote the relocation of more immune cells to the fatty plaques, intensifying the inflammation. This evidence strongly indicates that galectin-9 is a key factor in driving the accumulation of immune cells at the sites of inflammation within the plaques.

Importantly, elevated levels of galectin-9 have been detected in the blood plasma of patients with PAD compared to healthy individuals. In laboratory experiments, galectin-9 was coated onto microscope slides and then exposed to immune cells from either PAD patients or healthy controls. The immune cells from PAD patients adhered more readily to the galectin-9-coated slides compared to those from the healthy group. Cells lining the blood vessels were found to be a source of galectin-9, particularly in response to inflammation. Blocking the expression of galectin-9 in these cells led to a reduction in monocyte adhesion, providing further evidence that galectin-9 plays a pivotal role in atherosclerosis.

In summary, the data unequivocally demonstrates that galectin-9 contributes to the formation of fatty plaques in atherosclerosis (Fig. 1). Therefore, it represents an attractive target for potential prevention and treatment strategies for this condition. By identifying the role of galectin-9, researchers have taken a significant step forward in understanding the mechanisms behind atherosclerosis, paving the way for innovative approaches to tackle this complex and multifaceted disease.

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## Publication

Galectin-9: A novel promoter of atherosclerosis progression
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