Technology Offer

Innovative Method for Cholesterol Level Control

Glutamine Synthase regulating cellular cholesterol distribution

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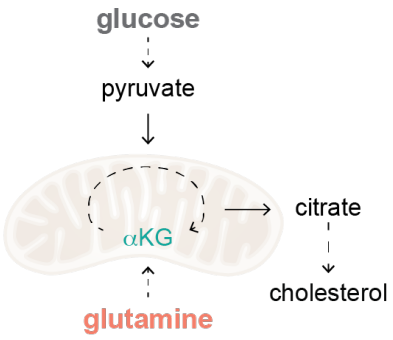
Researchers at the Max Planck Institute for Biology of Ageing have identified glutamine synthetase as a novel regulatory target for cholesterol biosynthesis. This approach enables selective cholesterol reduction while preserving vital cellular metabolites, offering a promising platform for safer and broader therapeutic applications.

Background

High cholesterol remains a global health challenge, contributing significantly to cardiovascular diseases, which affect approximately 39% of adults worldwide. Traditional treatments, such as statins, reduce cholesterol by inhibiting HMG-CoA reductase (HMGCR), a key enzyme in the mevalonate pathway. This pathway is critical to cellular metabolism, producing cholesterol and other isoprenoids essential for cellular integrity, mitochondrial function, and hormone synthesis. However, while effective at lowering cholesterol, statins also block the synthesis of important downstream metabolites like coenzyme Q10, leading to side effects such as mitochondrial dysfunction, muscle pain (myalgia), and an increased risk of diabetes. Novel therapies that selectively reduce cholesterol while preserving essential metabolic pathways are in high demand.

Technology

Scientists at the Max Planck Institute for Biology of Ageing have developed a method to regulate cholesterol synthesis by modulating glutamine synthetase (GLUL). GLUL, essential for glutamine levels, controls the activation of the mevalonate pathway, enabling selective cholesterol reduction without affecting essential metabolites like coenzyme Q10. Glutamine availability directly correlates with cellular anabolic potential, and targeting GLUL presents a promising therapeutic pathway for managing cholesterol levels in the cell.



The key advantages of this method include:

- **Selective Action:** Targets glutamine synthetase to lowers cholesterol synthesis without inhibiting critical mevalonate pathway derivatives levels. Controlled cholesterol management.
- **Minimized Side Effects:** Lowers cholesterol synthesis while avoiding the adverse outcomes of traditional statins, such as muscle pain and diabetes risk.
- **Broad Application Potential:** Offers dual utility for cardiovascular health and as an adjunct in cancer therapy, helping to hinder cholesterol-dependent cancer cell proliferation and applicable across various pathophysiological conditions.

Patent Information

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Publication

Publication: Glutamine-sensing licenses cholesterol synthesis, Bruna Martins Garcia et al., EMBOJ (under revisions)

Opportunity

We welcome **research partnerships** and **license agreements** with pharmaceutical companies to advance this method toward clinical application and are interested in developing novel cholesterol therapies that offer improved safety profiles and efficacy.

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