Docket #: S23-015

Blocking an immune receptor signal to treat obesity and fatty liver disease

Stanford scientists have discovered that blocking an immune receptor signal can lead to increased fat uptake and weight reduction in patients suffering from obesity and associated diseases. Blocking the immune signal can be applied in various contexts, such as treatment of nonalcoholic fatty liver disease (NAFLD), nonalcoholic steatohepatitis (NASH), diabetic nephropathy, and metabolic syndrome among other metabolic diseases.

Obesity is a global issue and commonly associated with conditions such as liver dysfunction, type 2 diabetes, and hyperlipidemia. The lack of effective therapeutics, coupled with a predicted 57% of the world population having an obesity-related condition by 2030, necessitates the development of novel treatment options.

Blocking the immune receptor signal in a fatty liver disease mouse model led to a ~28% decrease in weight and complete removal of abdominal fat over 10 weeks in treated mice relative to control mice. Additionally, a verified biomarker in the form of a risk allele is available which can be used to quickly and reliably determine if patients are likely to benefit from the treatment. Consequently, blocking agents for the immune receptor have the potential to enhance and complement current treatment options for obesity, such as weight management and GLP-1 agonists, and serve as a broadly useful treatment strategy for patients suffering from obesity-related conditions.

Applications

- Treatment of obesity-related conditions such as type 2 diabetes, fatty liver disease, and hyperglycemia

- Treatment of chronic inflammation and fibrosis of the liver and other organs
- Combined treatment with current available options such as weight management and GLP-1 agonists

Advantages

- Treatment agents can be readily developed (antibodies, peptides, etc.)
- Biomarker is available to identify patients that will likely benefit from treatment
- Flexible dosage and administration

Publications

- Wernig, G., Chen, S.Y., Cui, L., Van Neste, C., Tsai, J.M., Kambham, N., Vogel, H., Natkunam, Y., Gilliland, D.G., Nolan, G. and Weissman, I.L. (2017). Unifying mechanism for different fibrotic diseases. *Proceedings of the National Academy of Sciences*, 114(18), pp.4757-4762.

Patents

- Published Application: WO2024187041

Innovators

- Gerlinde Wernig
- Cristabelle De Souza
- Qiwen Deng

Licensing Contact

Eileen Lee

Email