

# Sweat Your Fat: Topical or Systemic Treatment of Obesity and NASH by Inducing Secretion of Lipids through Skin

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## Technology description

Topical treatment leading to upregulation of TSLP, recombinant TSLP, or TSLP expression by viral vectors use for weight loss and weight gain prevention in treatment of obesity, obesity-related disorders, NASH, and Type 2 Diabetes.

Technology:

Previously Dr. Kambayashi has discovered that topical administration of a vitamin D3 analog MC903 leads to the release of keratinocyte-derived thymic stromal lymphopoietin (TSLP) by skin cells into circulation, which then systemically increases the number of Regulatory T cells (Tregs). Such Treg upregulation led to attenuation of inflammatory diseases such as type I and type II diabetes, multiple sclerosis, atherosclerosis, and rheumatoid arthritis in mouse models. These results suggested that use of transdermal patch delivering MC903 could be a promising approach for treatment autoimmune and inflammatory diseases.

( [Tech 15-7433](#) )

Following on these studies the inventors have discovered that topical application of MC903 as well as systemic delivery or expression of TSLP leads to weight loss and prevention of weight gain in several mouse models of obesity. Inventors observed that weight loss occurred through selective loss of white adipose tissue, sparing muscle and brown adipose tissue. The treatment did not affect the levels of lipid and glucose absorption, O<sub>2</sub> consumption, CO<sub>2</sub> production, or locomotor activity. These observations led to discovery of new mechanism of adipose tissue loss caused by increased secretion of lipids through skin. In addition, TSLP expression also prevented High Fat Diet-induced hepatosteatosis suggesting that it could be used for treatment of Nonalcoholic Fatty Liver Disease (NASH).

AAV8-TSLP induces loss of subcutaneous fat in the skin of mice.

## Application area

- Weight loss
- Weight gain prevention
- Treatment of NASH and Type 2 Diabetes

## Advantages

- Effective loss of white adipose tissue without loss of muscle mass or brown adipose tissue
- Novel mechanism for weight loss
- Topical treatment producing systemic effect
- MC903 has limited systemic absorption and half-life preventing systemic toxicities
- MC903 is used for psoriasis treatment (expired patent, available generics)

## Institution

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