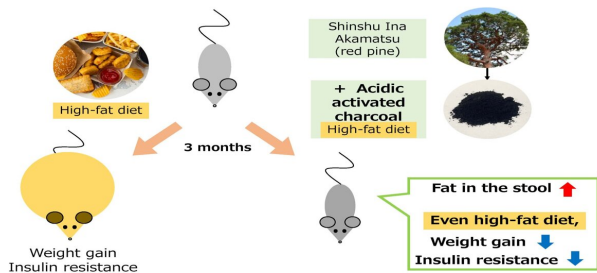


Acidic activated charcoal prevents weight gain and insulin resistance in high-fat diet mice

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Acidic activated charcoal from Shinshu Ina Akamatsu (red pine) prevents weight gain and insulin resistance in high-fat diet mice. Credit: Naoki Tanaka, Shinshu University

With the Westernization of eating habits, the proportion of obese people is increasing all over the world. Obesity is an urgent issue because obesity is a risk factor leading to various diseases such as diabetes, fatty liver and dyslipidemia. Edible activated charcoal is known to absorb urinary toxins and bile acids in the intestines and excrete them as feces. The research team led by Shinshu University's Department of Metabolic Regulation suspected that they would also absorb excess fat in the diet. The group was able to verify the effect and safety of acidic activated charcoal produced from Shinshu Ina's specialty the Akamatsu tree (red pine) on mice.

When mice were given a normal diet and a [high-fat diet](#) for 12 weeks each, the mice fed the high-fat diet gained significantly more weight than the normal diet. On the other hand, when acidic activated charcoal was mixed with a high-fat diet and given to mice in the same manner, the degree of [weight gain](#) was almost the same as that of a

normal diet, meaning the weight gain due to the high-fat diet was completely suppressed. When acidic activated charcoal is administered with a high-fat diet, the amount of bile acid, cholesterol, triglyceride, and fatty acid in the stool increases about 2 to 4 times as much as when the regular high-fat diet is administered. It is thought to promote excretion into the stool. No damage to the gastrointestinal mucosa or lungs due to acidic activated charcoal was observed.

Taking acidic activated charcoal with fatty foods or before eating may prevent weight gain. Based on the knowledge gained from this research, the group hopes to promote the development of acidic activated charcoal with better efficacy and safety while collaborating with local and global companies, hoping to contribute to the prevention of lifestyle-related diseases around the world.

Making charcoal has been widely popular in Shinshu for a long time, and activated charcoal made with such technology is also used for deodorization and water purification. This research clarified that acidic activated charcoal made by processing Shinshu Ina Akamatsu, prevents weight gain and insulin resistance of mice due to a high-fat diet. By incorporating acidic activated charcoal into the diet, it may be possible to prevent obesity, [fatty liver](#), and diabetes in people, which have been increasing in recent years.

Professor Naoki Tanaka, Department of Global Medical Research Promotion, Shinshu University, and the research teams of Ina Carbonization Laboratory Co., Ltd. (Ina, Japan) and Sumi Plus Lab Co., Ltd. (Yokohama, Japan) continue to research the application of charcoal produced from Akamatsu, a specialty from the area to medical health. This research result was published in *Frontiers in Nutrition*.

More information: Xuguang Zhang et al, Acidic Activated Charcoal Prevents Obesity and Insulin Resistance in High-Fat Diet-Fed Mice, *Frontiers in Nutrition* (2022). DOI: [10.3389/fnut.2022.852767](https://doi.org/10.3389/fnut.2022.852767)

Provided by Shinshu University

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