

## Researchers reveal how excess sugar causes fatty liver

New Delhi, June 14<sup>th</sup> (India Science Wire): In a new study conducted by the researchers at Indian Institute of Technology (IIT), Mandi has conclusively shown that excessive sugar intake leads to a fatty liver. This could offer an incentive for reducing sugar intake to stop non-alcoholic fatty liver disease (NAFLD) in its early stages. The unravelling of the molecular link between sugar and fat accumulation in liver is key to developing therapeutics for the disease, researchers said.

A team of researchers from IIT Mandi, led by Dr Prosenjit Mondal, Associate Professor, School of Basic Sciences, has used complementary experimental approaches to establish the underlying biochemical relationship between the consumption of excessive sugar and the development of 'fatty liver', medically known as Non-Alcoholic Fatty Liver Disease (NAFLD). This research comes at a time in which the Government of India has included NAFLD in the National Programme for Prevention & Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS).

NAFLD is a medical condition in which excess fat deposits in the liver. The disease starts silently, with no overt symptoms for as much as two decades. If left untreated, the excess fat can irritate the liver cells, resulting in scarring of the liver (cirrhosis), and in advanced cases, can even lead to liver cancer. The treatment of advanced stages of NAFLD is difficult.

Dr Prosenjit Mondal said, "The molecular mechanisms that increase hepatic DNL due to overconsumption of sugar have not been clear." "Our goal was to unravel this mechanistic pathway between excessive sugar consumption and onset and development of fatty liver Through DNL", he further added.

India is the first country in the world to identify the need for action on NAFLD and with good reason. The prevalence of NAFLD in India is about 9% to 32% of the population, with the state of Kerala alone having a prevalence of 49% and a staggering 60% prevalence among obese school-going children.

One of the causes for NAFLD is the over-consumption of sugar – both table sugar (sucrose) and other forms of carbohydrates. The consumption of excess sugar and carbohydrates causes the liver to convert them into fat in a process called hepatic De Novo Lipogenesis or DNL, which leads to fat accumulation in the liver.

Through a complementary experimental approach involving mice models, the IIT Mandi team has shown the hitherto unknown link between the carbohydrate-induced activation of a protein complex called NF- $\kappa$ B and increased DNL.

"Our data indicates that the sugar-mediated shuttling of hepatic NF- $\kappa$ B p65 reduces the levels of another protein, sorcin, which in turn activates liver DNL through a cascading biochemical pathway," explained the lead scientist.

The research team has shown that drugs that can inhibit NF- $\kappa$ B can prevent sugar-induced hepatic fat accumulation. They have also shown that the knockdown of sorcin reduces the lipid-lowering ability of the NF- $\kappa$ B inhibitor.

This study shows that NAFLD can now be added to the repertoire of diseases that can be treated with drugs that block NF- $\kappa$ B. NF- $\kappa$ B also plays a role in other diseases that involve inflammation, such as cancer, Alzheimer's disease, atherosclerosis, IBS, stroke, muscle wasting and infections, and scientists around the world are developing therapeutics that can block NF- $\kappa$ B, IIT Mandi Statement said.

This study has been published in the Journal of Biological Chemistry. The research paper has been co-authored by Dr Prosenjit Mondal along with his research scholars, Mr. Vineeth Daniel, Ms. Surbhi Dogra, Ms. Priya Rawat, Mr. Abhinav Choubey from IIT Mandi, in collaboration with Dr Mohan Kamthan and Ms. Aiysha Siddiq Khan from Jamia Hamdard Institute, New Delhi, along with Mr. Sangam Rajak from SGPGI, Lucknow. (India Science Wire)

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*Dr. Prosenjit Mondal and P. Vineeth Daniel (L to R)*