PRESS RELEASE

**Specific Liver Fats: Warning Signs of Fatty Liver Disease and Insulin Resistance**

**Overweight and type 2 diabetes are associated with nonalcoholic fatty liver disease (NAFLD). Worldwide, about 50 to 75 percent of people with type 2 diabetes have fatty liver. 10 to 20 percent of these patients even suffer from liver inflammation (NASH, steatohepatitis), cirrhosis or, in rare cases as a consequence, liver cancer. Scientists at the German Diabetes Center (DDZ) in Düsseldorf and the Touchstone Diabetes Center in Texas (USA) have found that specific biologically active substances measured in liver samples indicate the risk of insulin resistance and liver inflammation.**

**Düsseldorf (DDZ)** – The aim of the study was to find out to what extent specific fat degradation products in the liver (sphingolipids) can contribute to the development of insulin resistance, oxidative stress and inflammatory processes and thus can indicate an imminent diabetes. For this purpose, healthy, slim persons and persons with pathological obesity who had undergone bariatric surgery were examined. "In our study we show that in people with insulin resistance and fatty liver hepatitis, several sphingolipids are elevated," said Professor Michael Roden, head of the study. He went on to say that some of these lipids can be biomarkers for insulin sensitivity, oxidative stress and inflammatory processes in the liver. "This suggests that these lipid metabolism products contribute to the progression from a simple fatty liver to NASH,“ he emphasized. The scientists of the German Diabetes Center, a partner in the German Center for Diabetes Research (DZD), headed by Professor Michael Roden, published the results in cooperation with the Touchstone Diabetes Center in Texas (USA) in the June issue of the journal *Diabetes Care*.

In the study, the 21 overweight patients were divided into three groups – depending on the status of fatty liver disease. The first group had no fatty liver, the second group suffered from a fatty liver in the initial stage without signs of inflammation, and the third group had advanced inflammation with increased connective tissue formation in the liver. The different forms of fatty liver disease were determined on the basis of a liver biopsy. Ceramides were determined in the liver samples as well as in other tissues such as muscles and various fatty tissues. Ceramides belong to the sphingolipids, a group of biologically active substances that are important components of cell membranes.

The study’s results show that the patient group with a nonalcoholic fatty liver disease showed a higher concentration of total ceramides in the liver compared to the other groups. Furthermore, specific ceramides were characteristically elevated only in this patient group, which are associated with pronounced inflammation and oxidative stress, reduced function of mitochondria (cell power stations) in the liver and pronounced insulin resistance. The higher the level of specific ceramides, the worse the insulin sensitivity became.

Further analyses of different subgroups of sphingolipids could explain processes in the cells during the development of NASH and also type 2 diabetes.

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Diabetes, Type 2 Diabetes, Overweight, Fatty Liver, NASH, Lipids, Ceramides

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The German Diabetes Center (DDZ)  is a German reference center for diabetes. Its objective is to contribute to the improvement of prevention, early detection, diagnosis and treatment of diabetes mellitus. At the same time, the research center aims at improving the epidemiological data situation in Germany. The DDZ coordinates the multicenter German Diabetes Study and is a point of contact for all players in the health sector. In addition, it prepares scientific information on diabetes mellitus and makes it available to the public. The DDZ is part of the Leibniz Association (Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz, WGL) and is a partner of the German Center for Diabetes Research (DZD e.V.).

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