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Matthiesen, Connie Frank; Tauson, Anne-Helene

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Connie-Frank Matt

Peter Christian Abildgaards fond og Overdyrlæge Hans A. Madsen og Hustrus Fond

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Faculty of Health and Medical Sciences, University of Copenhagen
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Dietary supplements to a low protein diet may affect the occurrence of fatty livers in mink

Connie Frank Matthiesen & Anne-Helene Tauson
University of Copenhagen, The Faculty of Health and Medical Sciences, Grønnegårdsvej 3, first floor. DK-1870 Frederiksberg C, Denmark
cmt@sund.ku.dk

Fatty livers, i.e. hepatic lipid infiltration, is multifactorial and may be caused by a number of factors such as low protein provision, feed deprivation, rapid accretion or mobilisation of body fat, all resulting in metabolic and nutritional imbalances. Our objectives were to investigate if supplementation of a low protein diet with nutrients acting as methyl donors, antioxidants or having insulinogenic properties could lower the incidence of fatty livers in growing mink from August to November when mortality, caused by hepatic lipid infiltration, often is high.

Seventy-two young mink, 36 females and 36 males, were used in the study. The animals were allocated to six treatment groups each consisting of 6 males and 6 females. The control group (group 1) was fed a conventional farm feed (29.6:54.2:16.2 % of metabolisable energy (ME) from protein: fat: carbohydrate) whereas the 5 remaining groups were fed a low protein diet (20% of ME from protein, prepared by adding 5.5% corn starch, 3.5 corn oil, 6% potato mash powder, 1% sugar beet pulp and 8% water to the control diet) and supplemented with the crystalline amino acids alanine (0.8% - negative control - group 2), taurine (0.5% - group 3), arginine (0.5% - group 4), and methionine (0.5% - group 5) or the carbohydrate dextrose (2.5% of the corn starch was replaced with dextrose - group 6). Feed intake was recorded as an average per group per day. The animals were weighed and blood sampled once every third week. The liver was removed and the liver and body weights were recorded of all animals that died during the experiment. All remaining animals were euthanized at the end of the experiment when liver, kidney and body weights were recorded. All livers were frozen for later analysis. Liver weight was significantly affected ($P<0.001$) by dietary treatment, status (dead or alive) ($P<0.001$) and interactions between dietary treatment and status ($P<0.001$). This resulted in significantly heavier livers among animals diagnosed with fatty livers compared to livers from euthanized animals without hepatic lipid infiltration. The survival rate was significantly higher for controls (100%) and group 5 (methionine – 100%) animals compared to group 6 (dextrose – 75%) and numerically higher than group 2 (alanine – 92%), group 3 (taurine – 92%) and group 4 (arginine – 83%) animals. It can be concluded that our preliminary results indicate that the methionine level in a low protein diet plays an important role for the occurrence of lipid infiltration in the liver.