

## **Studies Summary – Effects of fish protein supplements**

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#### **A random study on the effects of fish protein supplement on glucose tolerance, lipids and body composition in overweight adults**

##### **Summary**

In this study, a random sample of 34 overweight adults were administered a daily dosage of fish protein for 8 weeks. Intake of fish protein was 3 grams per day in the first 4 weeks and 6 grams per day in the last four weeks. The findings show that an 8week intake of fish protein results into beneficial effects on the blood glucose levels and on the level of LDL-cholesterol.

It could be of interest to assess a long-term effect of fish protein supplements along with an increased consumption of fish as a protein source, and the effect of including fish in the diet of individuals that suffer from low glucose tolerance should be evaluated.

Source Vikøren, Linn A., et al. "A randomised study on the effects of fish protein supplement on glucose tolerance, lipids and body composition in overweight adults." *British Journal of Nutrition* 109.04 (2013): 648-657.

#### **A low dietary intake of cod protein is sufficient to increase growth, improve serum and tissue fatty acid compositions, and lower serum postprandial glucose and fasting non-esterified fatty acid concentrations in obese Zucker fa/fa rats**

##### **Summary**

Previous studies on rats indicate that fish protein may improve lipid and glucose regulation and it may consequently be an important tool in treatment of obesity related diseases.

Until now, all published studies on rats have been designed taking into consideration diets with a fish protein content of either 50% or 100%.

It is not recommended in a healthy diet to have a protein component coming exclusively from a single source. For this reason, it has been assumed that studies that evaluate the effect of diets with a lower percentage of fish protein could be of better significance.

In the present study, 12 overweight Zucker rats were fed by using a diet where the percentage of cod protein amounted to 25% of the total protein intake with the remaining 75% coming from casein (COD), whereas the other diet consisted of 100% casein protein only (CAS). The study was conducted over a four-week period.

The rats that were fed the COD diet experienced a higher increase in weight, without fat composition and muscle mass being affected. The rats that were fed the CAS diet had an increase in liver weight and in the level of cholesterol in the liver. The serum postprandial glucose and fasting non-esterified fatty acids concentrations were also found to be lower in the rats that were fed the COD diet.

A low intake of cod protein (25% of the total protein intake) was sufficient in positively influencing lipid metabolism and postprandial glucose regulation in obese rats.

Source: Drotningvik, Aslaug, et al. "A low dietary intake of cod protein is sufficient to increase growth, improve serum and tissue fatty acid compositions, and lower serum postprandial glucose and fasting non-esterified fatty acid concentrations in obese Zucker fa/fa rats." *European journal of nutrition* 54.7 (2015): 1151-1160.

## **Lean seafood intake reduces cardiovascular lipid risk factors in healthy subjects: results from a random controlled trial with a crossover design.**

### **Summary**

Observational studies have strongly indicated a correlation between fish consumption and reduced heart disease risk, but current experimental data is insufficient.

The present study has investigated the potential of two important protein sources, lean seafood and others protein sources, in the regulation of fasting and postprandial lipids in healthy individuals. The assumption was that consumption of lean seafood could reduce cardiovascular risk factors (lipids) in healthy individuals more effectively than consumption of proteins deriving from different sources. The study was a random controlled trial with a crossover design.

A sample of 20 people (7 men and 13 women) were given two balanced diets that differed in their protein source. Compared with other sources of proteins, an intake of lean seafood resulted into reduced concentrations of fasting and postprandial serum triacylglycerol. It appears that the source of proteins has an influence on lipids in the fasting and postprandial condition in healthy individuals and a possible effect in the long-term development of heart related diseases.

Source: Aadland, Eli Kristin, et al. "Lean-seafood intake reduces cardiovascular lipid risk factors in healthy subjects: results from a randomized controlled trial with a crossover design." *The American journal of clinical nutrition* 102.3 (2015): 582-592.

### **Dietary Cod Protein Improves Insulin Sensitivity in Insulin-Resistant Men and Women**

#### **Summary**

The purpose of this study was to compare the effect of cod protein's intake with that of other animal proteins on insulin sensitivity in insulin resistant men and women.

A sample of 19 insulin resistant individuals had diets that consisted of either cod protein or of a similar diet with protein from other animal sources. Results showed that an intake of cod protein appears to improve insulin sensitivity in insulin resistant individuals, and it can consequently contribute to prevention of type 2 diabetes by reducing metabolic complications related to insulin resistance.

Kilde: Ouellet, Véronique, et al. "Dietary Cod Protein Improves Insulin Sensitivity in Insulin-Resistant Men and Women A randomized controlled trial." *Diabetes Care* 30.11 (2007): 2816-2821.

### **Consumption of Lean Fish Reduces the Risk of Type 2 Diabetes Mellitus: A Prospective Population Based Cohort Study of Norwegian Women**

#### **Summary**

Development of type 2 diabetes is increasing worldwide and it constitutes a global health challenge. DMT2 is often associated with overweight and obesity and the focus is shifting more and more on evaluating the effect of different diets with an eye to prevention and treatment of DMT2.

The present study was based on a sample of 33 740 Norwegian women not affected by type 2 diabetes mellitus, with the aim of researching the risk for type 2 diabetes in connection with an intake of lean fish, fat fish, fish products and total fish intake, in addition to cod liver oil supplements.

Women who took 75-100 grams of lean fish per day had a beneficial effect on type 2 diabetes mellitus. It is not clear yet whether these findings can be attributed to a protective effect on type 2 diabetes mellitus stemming from consumption of lean fish in itself, or if people who eat lean fish have a life style that the authors of the study were

not able to take into account. Unfavourable effects of consumption of fat fish or cod liver oil on type 2 diabetes mellitus were not observed.

Source: Rylander, Charlotta, et al. "Consumption of lean fish reduces the risk of type 2 diabetes mellitus: a prospective population based cohort study of Norwegian women." *PloS one* 9.2 (2014): e89845.

## **A comparison of effects of fish and beef protein on satiety in normal weight men**

### **Summary**

Previous studies have indicated that fish protein has a bigger effect on feelings of satiety than other protein sources of animal origin do. The purpose of this study was to compare the effect of meals having a high content of proteins, from either fish or beef, on hunger and on the feeling of satiety.

People who ate fish protein in their evening dinners, ended up eating less in their successive meal (11% reduction of energy intake), compared to those who ate beef proteins, and without feeling hungrier.

Even though no significant differences in the VAS-rankings of satiety or hunger were detected, participants showed an 11% reduction in energy intake in the subsequent meal.

Source: Borzoei, S., et al. "A comparison of effects of fish and beef protein on satiety in normal weight men." *European journal of clinical nutrition* 60.7 (2006): 897-902.

## **Lean fish consumption is associated with lower risk of metabolic syndrome: a Norwegian cross sectional study.**

### **Summary**

Fish consumption may reduce occurrence of metabolism risk. The purpose of the present study was to identify associations between fish intake and MetS (metabolism risk) and its components, especially in relation to differences regarding intake of fat and lean fish. This cross section investigation uses data from six researches in Tromsø, where a sample of 12 981 adults of Norwegian nationality, varying from 30 to 87 years of age, took part.

Results show that a higher intake of fish, especially lean fish, was associated with a lower risk of developing MetS. It was also shown that a higher intake of both fat and lean fish is associated with a reduced TG and an increased HDL-C in circulation.

Source: Tørris, C., M. Molin, and M. Småstuen Cvancarova. "Lean fish consumption is associated with lower risk of metabolic syndrome: a Norwegian cross sectional study." *BMC public health* 16.1 (2016): 1.