

# **Effects of Soybean Oil and Fish Oil Emulsions on Glucose and Lipid Metabolism in Streptozotocin-Induced Diabetic Rats Receiving Total Parenteral Nutrition**

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## **Abstract**

Background: This study was designed to investigate the effects of fat emulsions with different fatty acid composition on plasma glucose and lipid metabolism in diabetic rats receiving total parenteral nutrition (TPN). Methods: Diabetes was induced in rats with streptozotocin (STZ), and the rats were fed rat chow ad libitum for 6 weeks to achieve a chronic diabetic state. Control and diabetic rats were each divided into two TPN groups. The basal solutions of the two TPN groups were isonitrogenous and identical in nutrients composition except for the fat emulsion, which was made of soybean oil (SO) or fish oil (FO). The TPN control rats (C-SO and C-FO) and diabetic rats (DM-SO and DM-FO) received solutions with 37.5% of the non-protein energy provided as fat at an energy level of 30 kcal/100 g body wt/d. Results: The results demonstrated that hyperglycemia and hypertriglyceridemia were induced by STZ in diabetic rats. There was no change in plasma glucose and insulin concentrations before and after TPN infusion in the TPN control groups, whereas plasma glucose as well as triglyceride (TG) and nonesterified fatty acid (NEFA) levels decreased significantly after TPN administration in the diabetic groups. No difference in the concentrations of plasma glucose, TGs, NEFAs, and insulin were observed between the two diabetic groups. Conclusions: These results suggest that compared with soybean oil, TPN with fish oil emulsion did not lead to lower plasma concentrations of TGs and NEFAs in STZ-induced diabetic rats. Also, no difference in plasma glucose and insulin levels between the two groups was observed.