Dairy and Industrial Sources of *Trans* Fat do not Impair Muscle Insulin Sensitivity. Evidence from the Trans-Insulin Clinical Trial in Overweight Women and from Skeletal Muscle Cell Cultures.

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Background- The two major dietary sources of *trans* fatty acids (TFA) are partially hydrogenated oils and ruminant-derived products. Epidemiological data suggest that chronic consumption of industrial sources TFA could be damaging for insulin sensitivity, but intervention studies on this issue have remained inconclusive.

Objective- The trial was designed to compare the impact of dairy *vs.* industrial sources of TFA on muscle insulin sensitivity.

Design- Sixty-three healthy women presenting a waist circumference >88 cm and a BMI >28 kg/m^2 were recruited. After a run-in period, the volunteers were randomized into three groups and received a four-week diet of 60 g/day of either low-TFA lipids (0.54 g/day, n=21), ruminant TFA-rich lipids (4.86 g/day, n=21) or industrial TFA-rich lipids (5.58 g/day, n=21). Changes in insulin sensitivity were assessed using hyperinsulinemic-euglycemic clamps. Cultured myotubes were used to examine the ability of TFA *vs.* oleic acid to reverse palmitic acid-induced insulin resistance.

Results- In the clinical trial, insulin sensitivity was not significantly altered after the intervention period. In myotubes, the deleterious effect of palmitic acid on insulin-stimulated Akt phosphorylation was partially and similarly reversed by oleic acid and TFA ($p<0.0001$ *vs.* palmitic acid).

Conclusions- Taken together, these data demonstrate that dairy and industrial-source TFA do not impair muscle insulin sensitivity.