Dairy Consumption, Obesity, and the Insulin Resistance Syndrome in Young Adults. The CARDIA Study


OBJECTIVE
To examine the independent association between dairy intake and the incidence of insulin resistance syndrome (IRS).

STUDY DETAILS
– A multicenter population-based prospective study of cardiovascular disease risk factor evolution, the Coronary Artery Risk Development in Young Adults (CARDIA)
– 3157 black and white adults aged 18 to 30 years followed for 10 years (from 1985-86 to 1995-96) at 4 study centers in the United States
– 923 of these individuals were overweight (body mass index [BMI] ≥25 kg/m²)
– The main outcome measure was the 10-year cumulative incidence of IRS and its association with dairy consumption
– IRS was defined as the presence of 2 or more of the 4 components:
  • Abnormal glucose homeostasis (fasting plasma insulin ≥20 µU/ml, fasting glucose ≥6.1 mmol/l or use of medications to control blood glucose)
  • Obesity (BMI ≥30 kg/m² or waist-hip ratio [WHR] ≥0.85 for women and ≥0.90 for men)
  • Elevated blood pressure (BP) (≥130/85 mmHg) or use of antihypertensive medications
  • Dyslipidemia (triglycerides ≥2.26 mmol/l or HDL cholesterol ≤0.90 mmol/l)
– Measurement was by diet history interview. The CARDIA Diet History queried usual dietary practices and obtained a quantitative food frequency for the past 28 days
– Dairy products included any item that was either 100% dairy (e.g., milk) or included dairy as one of the main ingredients (e.g., dips made with sour cream)
– Total dairy intake was classified into quintiles
– Clinical measurements included BMI, WHR, BP and levels of blood lipids, insulin and glucose

At baseline examination, 90% of the dairy intake was milk and milk drinks, followed by butter, cream and cheese

Exclusions included those with no year 0 or year 7 dietary data, unusually high or low dietary intake values, those who were pregnant at baseline or within 180 days of year 10 clinical examination or were taking medications that affect blood lipid levels

KEY FINDING
Increased dairy intake, regular or reduced fat, was significantly associated with a lower incidence of IRS and each of its components (obesity, hypertension, abnormal glucose and dyslipidemia) among individuals who were overweight (BMI ≥25 kg/m²) at baseline.

Ten-year incidence of IRS was lower by more than two-thirds among overweight participants in the highest category of dairy intake compared to the lowest category.

The associations were dose-dependent. Each daily occasion of dairy consumption was associated with a 21% lower odds of IRS (odds ratio = 0.79).

The associations were independent of other lifestyle or dietary factors and were similar in men and women and blacks and whites.

RESULTS
– Dairy intake was higher in whites than in blacks (p<0.001)
– Overweight individuals consumed less dairy than their normal-weight counterparts (p<0.001)
– Increased dairy consumption was associated with increased whole grain, fruit, vegetables and saturated fat intake and a decrease in the consumption of sugar-sweetened soft drinks
– The incidence of IRS was nearly 4 times higher in overweight blacks and nearly 5 times higher in overweight whites compared with their normal-weight counterparts
In overweight individuals, increased dairy intake was associated with a consistent reduction in incidence of each of the components of IRS over the 10-year period, even after adjusting for age, sex, race, calorie intake, study center and baseline BMI.

Incidence of high LDL-cholesterol, although not a component of IRS, was not associated with dairy intake.

Among overweight individuals, those who consumed the highest amounts of dairy (≥35 times/week or 5 or more times/day) were 71% less likely to develop IRS than those who consumed the least amount of dairy (<10 times/week or 1/2 times/day) (p for trend <0.001).

Participants consumed different dairy products of differing serving size.

After adjusting for non-dietary lifestyle factors, dietary fiber and protein, the odds of developing IRS were still 72% lower among overweight individuals, comparing the highest with the lowest dairy intake.

There was no significant associations between dairy intake and incidence of IRS for individuals who were normal weight (BMI <25kg/m²) at baseline, perhaps because they were protected from IRS and obesity by other lifestyle or genetic factors.

Dietary patterns characterized by increased dairy consumption may protect overweight individuals from the development of obesity and IRS, which are key risk factors for type 2 diabetes and cardiovascular disease.