

REVIEW ARTICLE

Alternate-day fasting and chronic disease prevention: a review of human and animal trials^{1, 2, 3}

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Calorie restriction (CR) and alternate-day fasting (ADF) represent 2 different forms of dietary restriction. Although the effects of CR on chronic disease prevention were reviewed previously, the effects of ADF on chronic disease risk have yet to be summarized. Accordingly, we review here animal and human evidence concerning ADF and the risk of certain chronic diseases, such as type 2 diabetes, cardiovascular disease, and cancer. We also compare the magnitude of risk reduction resulting from ADF with that resulting from CR. In terms of diabetes risk, animal studies of ADF find lower diabetes incidence and lower fasting glucose and insulin concentrations, effects that are comparable to those of CR. Human trials to date have reported greater insulin-mediated glucose uptake but no effect on fasting glucose or insulin concentrations. In terms of cardiovascular disease risk, animal ADF data show lower total cholesterol and triacylglycerol concentrations, a lower heart rate, improved cardiac response to myocardial infarction, and lower blood pressure. The limited human evidence suggests higher HDL-cholesterol concentrations and lower triacylglycerol concentrations but no effect on blood pressure. In terms of cancer risk, there is no human evidence to date, yet animal studies found decreases in lymphoma incidence, longer survival after tumor inoculation, and lower rates of proliferation of several cell types. The findings in animals suggest that ADF may effectively modulate several risk factors, thereby preventing chronic disease, and that ADF may modulate disease risk to an extent similar to that of CR. More research is required to establish definitively the consequences of ADF.

Key Words: Alternate-day fasting • calorie restriction • type 2 diabetes • cardiovascular disease • cancer • animal models • humans

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