Is Fasting Healthy?

Topic Overview
Fasting (consuming no food or fluid other than water) and juice-only fasting are being broadly advocated as health-promoting measures for two reasons:

- Fasting is promoted as a way to remove toxins. Rodent studies have revealed that fasting enhances the concentration of liver cytochrome P-450 (1). Cytochrome P-450 is a family of enzymes that metabolizes toxins and drugs in addition to their biosynthesis functions (2). Based on this fact, fasting has been widely promoted as a means to remove accumulated toxins through activating enzymes in the liver (detoxifying). Toxins are referred to as xenobiotics, which are foreign substances including drugs, environmental contaminants, and pesticides (3).

- Fasting is promoted as a way to improve cardiovascular health. This promotion is based on the finding that alternate-day fasting for eight weeks in obese people improves and lowers coronary heart disease risk indicators, such as low density lipoprotein (LDL) cholesterol and triglycerides (4).

Evidence Analysis
Liver Enzymes and Fasting
In spite of the promotion of fasting to remove accumulated toxins through liver enzyme activation, liver enzyme activation is much more complex than first assumed. Further animal and human research does not support the suggestion that activation of these enzymes health promoting. The apparent increase of cytochrome P-450 enzymes in rodent livers is actually due to the reduction of liver size, as fasting shrinks total liver size and so the actual liver content of this enzyme does not increase (5). Of additional concern, fasting markedly reduces liver glutathione (5), which facilitates drug excretion (6), and is an important endogenous antioxidant. Furthermore, fasted rats are more susceptible to damage by a toxin than fed rats (7). In an experiment to observe the effect of fasting on a rat’s ability to tolerate an exposure to the anesthetic ether, the ether increased reactive oxygen species, lipid peroxidation, and loss of the liver and kidney cytochrome P-450 in the fasted rats compared to the fed animals (7). Additionally, rats fed low protein diets have higher susceptibility to the toxic effects of high doses of pesticides (8).

Human studies of cytochrome P-450, conducted by assessing drug metabolism, reveal that low protein (9,10) and low energy (10) intakes reduce the function of cytochrome P-450. Thus, fasting and very low calorie diets, which are promoted to enhance the liver’s ability to remove toxins, are in fact more likely to reduce the liver’s detoxifying abilities by reducing both cytochrome P-450 and glutathione.

Benefits and Risks of Fasting
Some trials of alternate day fasting for eight weeks in obese people did find improvements in coronary heart disease risk markers (4); however, several studies revealed increases in insulin resistance within 24 to 72 hours of initiation of fasting (11-13). Even skipping breakfast for 14 days was found to raise LDL cholesterol and produce insulin resistance in
non-overweight women (mean BMI=23.2±1.6) (14).

Human studies have illustrated various concerns about fasting including:

• The loss of muscle mass was noted in one study as being significant within 24 hours and progressed to further losses as the fast proceeded to 72 hours (15). This loss occurred even when the eight healthy young male athlete participants exercised (60 minutes of running and strength training including sit-ups, push-ups, and squat repetitions) during the fast. The fast also resulted in a progressive loss in physical work capacity.

• Fasting resulted in significant declines in functional reach and how long healthy, young women (n=22) were able to balance on one leg after even a one-day fast (16).

• Fasting for 24 hours in men (aged 18-35) decreased mononuclear cell mitochondrial activity, an important aspect of immune function (17).

• Fasting headaches occur at rates of 4% after 16 hours of fasting (18), and in up to 50% of people with a single day of fasting (19). These headaches were not due to dehydration (19), were not related to caffeine or nicotine withdrawal (20), and were found to resolve within 72 hours after the resumption of food intake (18).

• At the point of 5% weight loss, a six-day fast produced less fat mobilization and more intracellular water loss compared with very low calorie (600 kcal) and low calorie (1240 kcal) diets in three groups of six obese men (21).

• Results of studies of long-term juice-only fasting for up to eight weeks indicate a loss of 20% body protein; a loss of 20-25% fat-free mass; biochemical evidence of deficiencies in thiamine, riboflavin, and vitamin K; a loss of 40% of whole body zinc (22), and osmotic myelinolysis (23). Once a long-term fast (44 days) was ended, people who fasted for these durations developed complications including refeeding syndrome with marked hypophosphatemia; hemodilution (24); and neurological symptoms with difficulty breathing, speaking, and swallowing, and requiring ventilation support (25).

The Bottom Line
A close examination of the evidence regarding the health effects of fasting does not support the denial of eating as a health-promoting activity. In fact, fasting may actually be deleterious to health by increasing insulin resistance while decreasing important liver detoxifying enzyme functions, muscle mass, and body nutrients, and ones ability to work and exercise.

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References


