



[Alcohol, weight gain, and health: the facts](#)

Recently there was news that a so-called fasting-mimicking diet had beneficial effects on various biomarkers of aging in both mice and humans. ([Cell Metabolism](#).) I intend to cover this development in my next post, but for now, we'll just note that this diet was low calorie, low protein, and designed to induce ketosis and reduce growth hormone axis signaling.

What else is low protein, low carb, and low fat? Alcohol. Is it at all possible that consuming calories from alcohol counts toward a fasting-mimicking diet? That is, can it help to reverse aging?

Stranger things have happened. We already know that moderate drinking is associated with longer lifespan, mostly through the reduction of cardiovascular disease. ([Pathophysiology](#).)

Alcohol is a 4th macronutrient

There are three basic macronutrients from which higher organisms get sustenance; carbohydrate, protein, and fat. But there's a 4th: alcohol. From the [McKinley Health Center of the University of Illinois](#):

"Besides carbohydrate, protein, and fat the only other substance that provides calories is alcohol."

The McKinley Center then goes on erroneously to say that alcohol is not a macronutrient, since we don't need it to survive, but unfortunately for them we don't need dietary carbohydrate to survive, so then that wouldn't be a macronutrient by their lights either.

Alcohol is [metabolized](#) (pdf) into acetaldehyde, a relatively toxic product,

and the acetaldehyde is in turn made into acetate, from which energy can be derived. However, the acetate appears mainly to be just burned as energy rather than stored. It is possible that the acetate could feed into a metabolic pathway that makes fat.

Alcohol and health: Guess what → Hormesis

Alcohol, as mentioned, is associated with lower rates of cardiovascular disease (CVD), that is, heart attacks and stroke. Both case-control and epidemiological studies have found consistently that alcohol drinkers have a lower risk of heart disease and consequently a lower risk of death. The caveat here is that in younger populations that have a low incidence of heart disease, there will be no beneficial effect of alcohol on health, since there's no CVD to mitigate.

So if you're 25 years old and you drink, don't fool yourself that you're doing something good for your health. If you're over 45, you likely are doing something beneficial.

Alcohol causes health benefits via hormesis, that is, the ingestion of low doses of a toxin, in this case ethanol and its metabolic product acetaldehyde, causes the up-regulation of cellular stress defense mechanisms. ([European Journal of Clinical Nutrition](#).) Essentially, the metabolism of alcohol causes the release of reactive oxygen species, with concomitant increase in heat shock and antioxidant proteins. There are

19 separate epidemiological studies conducted over the last three decades that describe the impact of alcohol on total mortality as J-shaped, with **a beneficial effect of regular light-to-moderate intake (10–40 g per day, or one to three alcoholic beverages), and a detrimental effect of both lower and higher intake.** These studies have been reported by a large number of different research teams, with the effects observed in populations of different genders, races and nationalities.

One also needs to note here some confounding in the results, because [higher IQ is independently associated with both more drinking and better health.](#)

Aside from its hormetic effects, alcohol would not be expected to raise levels of IGF-1 or growth hormone nor to activate mTOR, as proteins and carbohydrates do. This is the basis of my assertion – or guess, or whatever – that alcoholic calories could actually play a role in a fasting-mimicking diet.

Moderate alcohol intake is not associated with weight gain

Studies conflict on this, but a number of them have found that alcohol intake is not associated with weight gain. ([American Journal of Clinical Nutrition](#).)

The reasons appear to be two: drinkers compensate for alcoholic calorie consumption by eating less, and alcoholic calories appear to be inefficiently metabolized. Recall what I wrote above about these calories being stored only with difficulty, which fits in with this idea of inefficient metabolism.

Ethanol is not stored in the body, but it is oxidized in preference over other fuels. The addition of ethanol to a diet reduces lipid oxidation measured over 24 h whereas oxidation of carbohydrate and protein are much less inhibited. ([American Journal of Clinical Nutrition.](#))

Some studies have found, however, that heavy drinkers (more than 3 drinks a day) do tend to have a higher body weight.

Some of these studies such as the above cited one muse at length about confounding factors that may explain the “paradox” that drinking alcohol does not apparently cause weight gain.

The types of drinks consumed may affect body weight

I wonder whether they have ever considered the type of drinks people consume.

Alcoholic drinks, as opposed to pure ethanol, vary widely in the amount of calories, sugar, and other calorie sources. For instance, [a White Russian has 257 calories](#), much of it from sugar. This probably explains Lebowsky's weight problem. [A hot buttered rum comes in at 316.](#)

[A beer comes in at 155 calories](#), but this is a bit misleading, since beer contains maltose, a sugar.

By contrast, hard liquor contains calories only from ethanol. [A scotch contains 78 calories](#), and this would be roughly the same for a shot of vodka, gin, or rum.

Red wine is similar; [a glass contains 85 calories](#).

So, weight gain could vary tremendously depending on what one's drink of choice is.

The lesson here is, I believe, that if you want to stay lean, choose plain highballs, such as a scotch on the rocks or something similar, or dry red wine. Avoid drinks with added sugar, such as margaritas, gin and tonics, or White Russians. Beer is probably best avoided too.

Bottom line

Alcohol acts through hormesis, and as such it is healthy in moderate amounts of possibly up to 3 drinks daily. Don't expect miracles though. The way I look at it is that in moderation it's relatively benign, not that it will improve my health.

Amounts greater than that are to be avoided for health reasons.

It's sugar, not ethanol, that is most likely causes weight gain. If you want to stay lean and muscular, choose plain highballs or dry red wine.