Obesity and insulin resistance cause aging, not the other way around

How much is aging really inevitable?

A number of physiological processes change with aging, notably autophagy, inflammation, and oxidative stress. While we can do many things to ameliorate them and thus improve health, as far as I can see, they are immutable facts of aging; in other words, the best diet, exercise, and supplement program in the world can be a great help, but it won't bring these aberrant processes completely back to their youthful state.

Is increased fat mass inevitable?

However, there are a number of processes associated with aging that do not look like they are inevitable at all, for example, obesity. In a review called The Critical Role of Metabolic Pathways in Aging, it is stated, “In humans, increased adiposity typically develops between the third and seventh decades of life and may increase, decrease, or remain unchanged thereafter. … Aged rodents also develop increased fat mass, with a disproportionate increase in VF [visceral fat] compared with SF mass, demonstrating similarity to human aging (5).” Statements to the effect that increased fat mass and/or obesity characterize aging can be found in many other studies and reviews in this field, and this one is typical enough. But how true is it? Is increased fat mass all but inevitable with age?

Note that rodents are also characterized as getting fatter with age, which might make one think that it can’t be an artifact of humans with their poor diets and unrestrained eating and general lack of desire to exercise. But lab rodents are housed artificially and fed a standard lab diet – you can see one
version [here](PDF); the first few ingredients include ground corn, cane molasses, and soybean oil. I don’t know exactly what rats eat in the wild, but I doubt if molasses and soybean oil figure in their diets. If this is typical of all lab rodents, then it’s no wonder they get fat as they get older.

As for humans, most of us eat terrible diets, high in refined carbohydrates, sugar, vegetable oils, packed together into processed food that encourages overconsumption. It doesn’t seem strange that humans get fat as they age on that stuff either. Even active young people do so, and holding off the pounds gets harder as we age.

**Insulin resistance**

Insulin resistance is intimately associated with the level of fat mass in humans and animals, and is characteristic of diabetes. High insulin resistance usually means higher levels of insulin, and this predisposes to heart disease and cancer. Aging experts usually also mention insulin resistance as being an inevitable malady of aging; for instance, in the first review already quoted:

> Insulin resistance (IR) represents a major component of metabolic syndrome (MS) and is commonly observed in older adults (2). Major impairments include unrestrained hepatic gluconeogenesis, adipose lipogenesis, and defective glycogen synthesis and glucose uptake in skeletal muscle. Abdominal obesity, which is commonly observed with aging, is a major contributor to IR and MS (3).

But to say it again: these observations come from humans that basically eat lousy food unrestrainedly and get very little exercise. Is insulin resistance and all the horrible things it’s associated with inevitable?

**The Kitavans have low levels of insulin**

A clue comes from a study that took place in Kitava, a remote South Pacific island where the people live a traditional lifestyle and eat homegrown and home-caught, unprocessed foods. Sweet potatoes, coconuts, and fish make up the bulk of the diet, and most people are lean and active. The paleo pioneer Staffan Lindberg studied the insulin levels of Kitavans and compared them to those of Swedes of the same age: [Low serum insulin in traditional Pacific Islanders—the Kitava Study](Low serum insulin in traditional Pacific Islanders—the Kitava Study).

Serum fasting insulin levels were lower in Kitava than in Sweden for all ages. For example, the mean insulin concentration in 50- to 74-year-old Kitavans was only 50% of that in Swedish subjects. Furthermore, serum insulin decreased with age in Kitava, while it increased in Sweden in subjects over 50 years of age. Moreover, the age, BMI, and, in females, waist circumference predicted Kitavan insulin levels at age 50 to 74 years remarkably well when applied to multiple linear regression equations defined to predict the
levels in Sweden. The low serum insulin that decreases with age in Kitavans adds to the evidence that a Western lifestyle is a primary cause of insulin resistance. Low serum insulin may partly explain the low prevalence of cardiovascular disease in Kitavans and probably relates to their marked leanness. [emphases mine]

Based on this study, it looks like age has remarkably little to do with insulin levels and, presumably, resistance. Eating a decent diet, staying active, and remaining lean all but abolish increases in insulin.

**Obesity and insulin resistance cause aging**

A recent lab study took a look at insulin sensitivity in humans, studying young lean, old lean, young obese, and old obese humans. *Age, Obesity, and Sex Effects on Insulin Sensitivity and Skeletal Muscle Mitochondrial Function*. Bullet point:

> Obese participants, independent of age, had reduced insulin sensitivity. In contrast, age had no independent effect on insulin sensitivity. The results demonstrate that age-related reductions in insulin sensitivity are likely due to an age-related increase in adiposity rather than a consequence of advanced chronological age. [my emphasis]

Visceral fat is associated with insulin resistance, and it’s been shown in animals that _surgical removal of visceral fat increases lifespan_. Quote: “Taken together, these observations provide the most direct evidence to date that a reduction in fat mass, specifically VF [visceral fat], may be one of the possible underlying mechanisms of the anti-aging effect of CR [calorie restriction].”

My interpretation of this study: increased fat mass causes aging, not the other way around.

Taken together, these studies cast lots of doubt on the notion that insulin resistance and increased fat mass are caused by, or inevitably associated with, aging. Instead, they are the result, or at least largely the result, of poor diet and lack of exercise. Another example that comes to mind of a pathological process attributed to aging is _sarcopenia, or muscle wasting_, but that will have to wait for another post.

**You can do a lot to decrease aging**

Conclusion: a decent diet, low in refined carbohydrates, plus sufficient and suitably intense exercise, will ameliorate some of the worst effects of aging, that is, insulin resistance and increased fat mass, and will in turn greatly lower the risk of heart disease, cancer, and diabetes. Obesity and insulin resistance cause aging, and are not inevitable.