“ONCE YOU BUY A FAT CELL IT IS YOURS TO KEEP”

Low fat diet - normal adipose tissue

High fat diet adipose

Obesity inducing diet/lifestyle - gene environment interactions

Diet/pharmacotherapy

Excess fat is stored in lipocytes, which expand in size until the fat is used for fuel

Fat reservoir

Nucleus

RECEPTORS FOUND ON ADIPOCYTE

Insulin

Growth Hormone

Leptin

Angiotensin II

Glucagon Like Peptide-1

Glucagon

Gastrin

TNF-α

IL-6

Vit D

Thyroid Stimulating Hormone

Glucagon

[β1, β2, β3, α1, α2]

Androgen

Estrogen

Thyroid Hormone

Glucocorticoid
Fat Cells

Most people think of fat as this blob of buttery stuff sitting there passively just under their skin. Most people don’t realize that fat or adipose tissue in the body behaves much like an organ than a passive blob, and that their fat or adipose tissue can also influence how fat they become.

Adipose tissue, also known as body fat, is essential for health. It might surprise you, but we all need it and our bodies can’t work without it. It is basically just loose connective tissue filling the gaps between organs and tissues.

As mammals, we are born with two different types of adipose tissue: white adipose tissue (most common) and brown adipose tissue. This tissue provides us with insulation, acts as a place for energy storage in times of starvation or physical exertion (e.g. when we exercise), and serves as a layer of protection for our organs and tissues. Meanwhile, brown adipose tissue is mostly found in newborns. Its main function is to generate body heat and also provide protection and padding for the body. If you've ever wondered why babies are so plump and chubby, it’s because they have a thicker layer of adipose tissue to protect them while they’re learning to be mobile.

In addition to the above two fat types, adipose tissue is also categorized by where it is stored. You may have heard about visceral fat. It is the fat that lies deep within your body wrapped around your inner organs. People with large waists or stomachs usually have visceral fat. It is the fat most linked to a range of troubling health conditions including diabetes, stroke, heart disease, and dementia. On the other hand, subcutaneous fat is much different to visceral fat as it is found directly under the skin and is not known to cause as many problems as its ‘deeper fat’ counterpart.

Now let’s talk about how our fat cells work…

We are all born with a certain number of fat cells. When these cells get full (from the fat we eat), they divide to make more. Unfortunately, once we have made more fat cells they are there to stay! But you might ask: what if we lose weight? Well, they will shrink but not completely disappear. You will always have the affinity to make more.

I like to use the ‘store shed’ analogy. If you live in a house and are in a habit of hoarding, you will quickly fill up your storage space. One solution might be to build more storage, like a shed. But you are in a habit of storing so you quickly fill this up too. One day you might decide to get rid of all the stuff you don’t want, so you clear out the shed and have a garage sale. But clearing out the shed doesn’t make the shed go away. From now on you will
always have the ability to store more than you need, and it will be easier because you have that extra space. It works the exact same way with the fat cells in our body. With all those extra fat cells hanging around in our body, we will end up craving more highly fatty foods in the hope of satisfying these hungry cells.

This leads us to how our fat tissue influences our appetite. Our fat cells secrete a hormone called Leptin, which helps to regulate energy by impeding hunger. Basically, when one is obese, the leptin hormone doesn’t work as it should. Obese individuals will find they can no longer detect that they are full, leading to an increase in unnecessary food consumption.

Stress also plays a role with fat. A highly stressed state will increase fat receptors in your gut, so you can store fat more easily. One interesting thing that happens in response to stress is our food preferences change. Our taste buds prefer sweeter and fattier foods. and when we are stressed, we are able to eat more before noticing we are sated.

Also in times of stress, the stress response will call for instant energy, meaning that it will use and burn glucose, and will hold onto its fat, resulting in storing more fat in response to ongoing (chronic) stress.

So remember, your adipose tissue will influence your appetite, it will influence how much fat you are able to store, and depending where it is laid down, it can also either positively or negatively affect your health.

References:
Body Fat Facts

Fat or __________________________ in the body behaves much more like an __________________________ than a passive blob, and can ____________ how fat someone becomes. Adipose tissue, also known as body fat, is ________________ for health. It might surprise you, but we all need it and our bodies ______________ without it. It is basically just ____________________________ filling the gaps between ___________________ and ___________________.

Mammals are born with two different types of adipose tissue: ___________________ adipose tissue (most common) and ___________________ adipose tissue. This tissue provides us with ____________________, acts as a place for ____________________ in times of starvation or physical exertion (e.g. when we exercise), and serves as a layer of _______________ for our organs and tissues. Meanwhile, brown adipose tissue is mostly found in ________________. Its main function is to ______________ and also provide protection and ________________ for the body. If you’ve ever wondered why babies are so plump and chubby, it’s because they have a thicker layer of adipose tissue to _______________ them while they’re learning to be ________________.

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Now let’s talk about how our fat cells work...

We are all ______________ a certain ______________ of fat cells. When these cells get ________ (from the fat we eat), they divide to make more. Unfortunately, once we have made more fat cells they are there to ________! If we lose weight they will ______________ but not completely disappear. You will always have the affinity to make more, kind of like how a house with a ______________________ has room for extra stuff if you get it, and even if it’s empty it doesn’t make it disappear. Once you have that shed you will always have the ability to store more than you need, and it will be _______________________________. It works the exact same way with the fat cells in our body. With all those extra fat cells hanging around in our body, it makes us ______________ more highly ______________ in the hope of ______________ these hungry cells.

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