Genetic Lifehacks

Learn. Experiment. Optimize.

Hi everyone,

This week's article is a bit of a departure from the normal. Instead of a single variant that causes a specific symptom, I'm diving into how genes can be transcribed into mRNA and then prevented from becoming a protein.

Let me give a little background...

I often explain that genes code for proteins/enzymes, but what goes on inside a cell gets a lot more complex. The field of epigenetics is all about which genes are available to be translated into proteins.

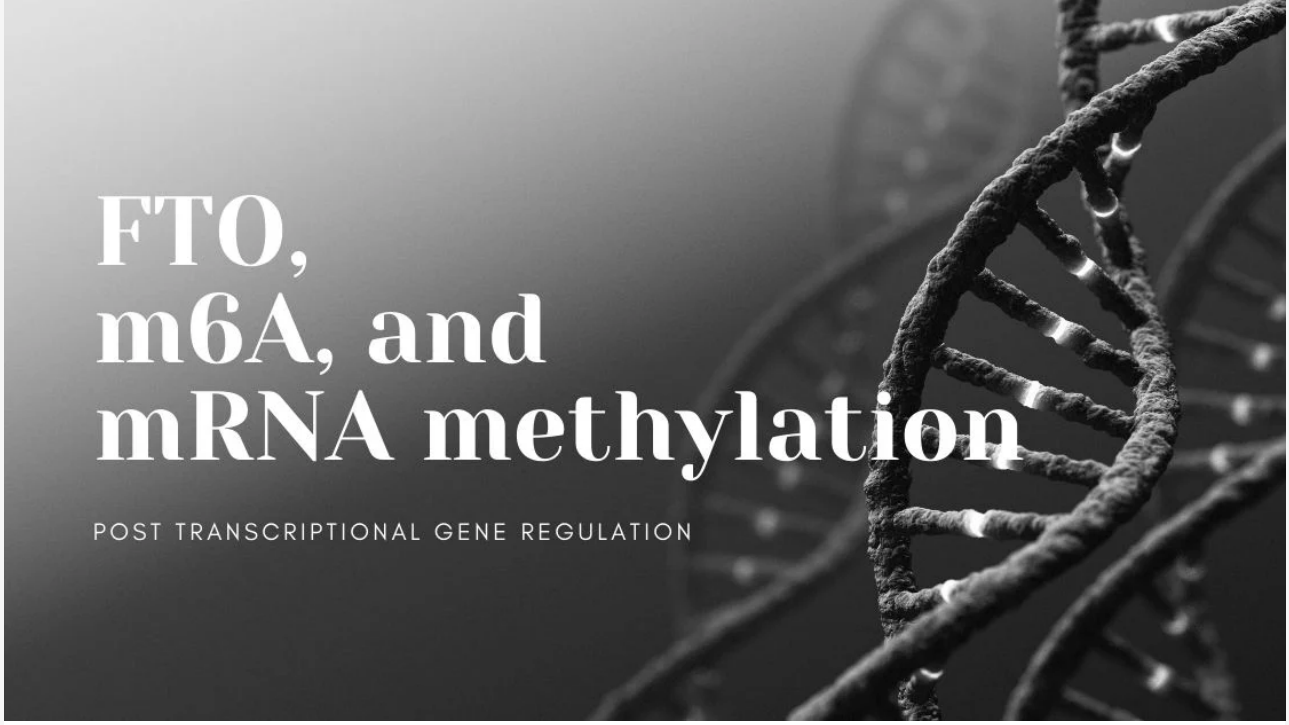
Beyond epigenetics, though, is a whole host of different ways that a gene transcribed to mRNA is modified -- prevented from being translated into a protein or altered to become a different version.

My latest article dives into one specific way that cells can regulate which mRNAs are translated into a protein. It is based around the research on one specific gene, FTO. The mRNA modifications impact many different physiological processes - from metabolism to cancer to the way that viral mRNA is replicated.

I hope you find the article intriguing - a glimpse into the complexity inside a cell.

Gratefully yours,

Debbie Moon



Latest article!

FTO and m6A methylation: From COVID to Cancer to Obesity

Every second of every day reactions are taking place inside your cells that turn the information in DNA into the proteins that run our lives. But have you ever wondered how cells can regulate which genes are translated and how much of a specific protein is created? It turns out that the FTO gene, which was originally discovered through obesity research and dubbed the 'fatso' gene, is just one player in a fascinating and complex process.

I'm going to dive into some recently discovered ways that your cells regulate and fine-tune exactly which proteins are created. It is a timely topic because this ties into how mRNA from a virus, such as COVID-19, is created. It is also a timeless topic... while the research is new, this method of controlling which proteins are created is ancient and used throughout the plant and animal kingdoms.

Regulating gene expression: FTO and mRNA methylation

I'm going to admit up-front here that this article gets a little more in-depth with the new research - a little more complicated - than most Genetic Lifehacks articles. If you are just looking for a quick overview of FTO and weight, jump over to this article.

First, a quick overview of some basic biology to make sure we are all on the same page. Then I'll explain the recent research on mRNA m6A methylation.

What is mRNA?

I often state that a gene codes for a protein - and that is true, in a general sense.

Genes are segments of DNA that are transcribed into mRNA (messenger RNA). Ribosomes then translate the mRNA into the amino acids that make up proteins.

Read the full article...

What I've been reading:

1) Oh, Deer! SARS-CoV-2 in white-tailed deer.

White-tailed deer carry an ACE2 receptor that is high in similarity to humans. This preprint study looked at blood samples of deer in NY, PA, MI, and IL from 2019 to 2021. In this year's samples, 40% of the deer have antibodies to SARS-CoV-2, which is quite a bit higher than the 2020 samples. Interestingly, one of the samples from Fall/Winter 2019 also had the antibodies.

Researchers believe that the deer were likely infected by humans, but it could have been from humans infecting another animal which then infected the deer. This is termed 'reverse zoonosis' when a human disease is spread to an animal.

Of course, my thoughts quickly went to: "What other animals are getting and transmitting COVID?" There were reports early on in the pandemic that cats, dogs, lions, and tigers can all get the SARS-CoV-2 virus. (Turns out that cats *may* be able to transmit the virus back to humans -- study)

For anyone else wondering which animals have ACE2 receptors that are similar to the human ACE2 receptor, check out this PNAS article that includes an extensive list of animals. And if you see a narwhal sneezing, perhaps it has the covid?

2) Smelling the coffee...

Researchers found that the smell of coffee is calming for some people. The study focused on dental patients undergoing procedures - a stressful time for many of us. The researchers measured cortisol levels, blood pressure, and heart rate to see how stressed the patients were. For patients that were inhaling the coffee aroma, cortisol levels were about 25% lower.

3) How things have changed:
18 years ago in Australia the government levied fines of up to $110,000 for businesses that promoted face masks as a way to prevent the spread of the original SARS virus.

4) Lab-grown salmon?

Here's a video on a startup company that is growing salmon for food consumption from salmon cells. The cells are grown into salmon muscle tissue on a plant-based scaffold or mesh. (article) Somewhat ironically, the company is called Wildtype.