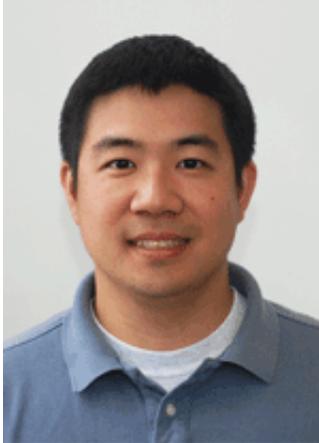


# DNA dumpster diving

January 13 2016, by Lawrence Goodman

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Since the 1960s, it's largely been assumed that most of the DNA in the human genome was junk. It didn't encode proteins—the main activity of our genes— so it was assumed to serve no purpose. But Assistant Professor of Biology Nelson Lau is among a new generation of scientists questioning that hypothesis. His findings suggest we've been wrong about junk DNA and it may be time for a reappraisal. If we want to understand how our bodies work, we need to start picking through our genetic garbage.

BrandeisNow sat down with Lau to ask him about his research.

## **First off, what is junk DNA?**

About two percent of our [genome](#) carries out functions we know about, things like building our bones or keeping the heart beating. What the rest of our DNA does is still a mystery. Twenty years ago, for want of a better term, some scientists decided to call it junk DNA.

## **Is it really junk?**

There's two camps in the scientific community, one that believes it doesn't do anything and another that believes it's there for a purpose.

## **And you're in the second camp?**

Yes. It's true that sometimes organisms carry around excess DNA, but usually it is there for a purpose. Perhaps junk DNA has been coopted for a deeper purpose that we have yet to fully unravel.

Now let's get down to the nitty gritty. You study the PIWI (pronounced "PEE-WEE") pathway. First, tell us what a pathway is.

A pathway is a combination of genetic and biochemical reactions.

## **And the PIWI pathway specifically?**

Much of junk DNA is the remnants of viruses and other genomic parasites that have infiltrated the [human genome](#) over hundreds of millions of years of evolution. The PIWI pathway keeps them from spreading. It's like the junk DNA are outlaws and the PIWI pathway keeps them from escaping from jail.

## **What would happen if they did escape?**

It would stop our germ cells our sperm and eggs from developing

normally. The human race would cease to exist.

But wait a second. Your research has shown some bits of junk DNA don't get stopped by the PIWI pathway.

Yes. Every once in a while it sneaks out past the cop.

## **So why hasn't our species gone kaput?**

It's not enough to do damage. In fact, it might be good for us. I like to recall the idiom, "One man's junk is another man's treasure."

## **Huh?**

Maybe when junk DNA moves to the right place in our DNA, this could cause better or faster evolution. Maybe when junk genes interacts with the non-junk ones, it causes a mutation to occur so humans can better adapt to changes in the environment.

## **Which would mean junk DNA does have a function after all.**

Exactly.

## **So shouldn't we stop calling it junk?**

I'd like to call it the [dark matter](#) of the genome. Dark matter comprises much of the universe, but it remains a mystery. There's also dark matter in the our genome that we don't understand yet.

## **One last question. Why do they call it PIWI?**

When they knocked out the PIWI [pathway](#) in the fruit fly, it developed tiny testis. PIWI stands for P-element induced wimpy testis.

Provided by Brandeis University

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