



TIMOTHY Caulfield THE CURE

It's not all in the genes

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e have been subjected to years of obesity-related headlines, and the news almost always seems to be discouraging.

Obesity has become a public health crisis that gets worse all the time, seemingly immune to public policy fixes. Nothing we do at a societal level has significantly altered the grim trend.

Take just the latest big study, co-authored by dozens of the world's leading experts and published in May 2014 in the *Lancet*, one of the world's leading medical journals. It concluded that 2.1 billion people are now considered overweight or obese. Most worrisome, the research found that despite significant government investment in a range of awareness and preventative strategies, not a single country has made progress on the problem. As the authors bluntly conclude: "Not only is obesity increasing, but no national success stories have been reported in the past 33 years."

Given this kind of data, it is no surprise there is an intensifying search for a technological, pharmaceutical or, at least, biomedically oriented answer. Where public policy has failed, perhaps an anti-obesity drug, or a unique, personalized preventative approach can turn the tide.

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The search for an "obesity gene" is a big part of the cutting-edge, science-will-save-us ethos. Rarely a week goes by without a proclamation that our weight problem is in our genes. From the *Globe and Mail* back in 2008 ("Now you can blame those extra pounds on the 'ice age' gene"), to the *New York Times* in summer 2013 ("Overweight? Maybe You Really Can Blame Your Genes") and the always reliable *Daily Mail* in 2011 ("We've found the gene that makes you fat, claim scientists studying obesity"), the emerging message seems to be that we should be looking to genetic-based solutions to fix our public health crisis.

This is a mistake, for many reasons.

While genetics clearly plays a role in our weight — as illuminated by studies of identical twins raised in separate environments — the predictive power of genetics, at least to date, has not been terribly impressive. The gene mutation most often linked with obesity is the FTO gene (the symbol for "fat mass and obesity-associated"). Yet it is associated with, on average, weight gains of only a few extra kilos. And many people who have the gene are not obese.

Furthermore, the relationship between genes and weight gain is tremendously complex. Consider, for example, the recent studies suggesting that our genes have an influence — to a greater or lesser extent — on appetite, taste, hunger, metabolism and how quickly we feel full. They may also play a role in how we respond to exercise and to sleep. Yet all these genes interact. Even if it could be done, targeting the action of just one gene, or even a set of genes, seems futile. Humans are pretty complex biological entities with many system redundancies.

Genetic predisposition information has been shown to have little impact on human behaviour. One of the common justifications for the adoption of a genetic approach to obesity — particularly in this era of "personalized medicine" — is that disclosing predispositions will motivate people to adopt healthier lifestyles. If you know you are at genetic risk, the thinking goes, you will change your behaviour.

In fact, there is little evidence to support this idea. On the contrary, studies have consistently shown that people do not change their behaviour as a result of genetic information. Heck, most of us don't change our behaviour based on the number we see on a weigh scale — a far more predictive biomarker of our future health than almost any bit of genetic-risk information.

A 2012 study by Ruth Loos of the MRC Epidemiology Unit of Cambridge University that examined the value of

obesity-related genetic tests concluded that "their accuracy to predict obesity is poor and not competitive with the predictive ability of traditional risk factors." There is little evidence to suggest "they could have a beneficial effect on behavior," the study reported.

Another reason to be wary of the genetic fix for obesity is that few Canadians eat a balanced diet, exercise enough or are even aware of how many calories they do or should consume. A 2012 study by the Canadian Obesity Network explored calorie literacy and found that only 1 in 10 people could correctly identify the calories in a typical meal. Given these profound lifestyle deficits, focusing on genetic predispositions seems like worrying about a car's broken windshield wipers when the engine doesn't work. Let's deal with the big stuff first, then we can tweak preventative approaches to accommodate individual genetic differences.

Finally, a focus on genetic information may cause us to shift our policy attention away from broad social change — which, as suggested in the recent *Lancet* study, is urgently needed — and toward the individual. A 2009 study by Colleen L. Barry et al. from Yale University found that framing obesity as being linked to inherited traits makes government action seem impractical and, as a result, may have the "unintended consequence of stifling public policy action."

I am not saying that research on the genetics of obesity is useless. In addition to simply allowing us to gain a greater understanding the biology behind weight gain (a worthy goal on its own), it may help to inform future interventions. But we are looking at a public health problem across a broad swath of the population. It is absurd to concentrate on our genes to reverse an obesity epidemic. Our genes haven't changed over the past few decades. Our environment has.

There are enough biological and social factors associated with obesity to make your head spin. Yes, genes are one important factor. But the list of possibly contributors includes our sleep habits, the microbes living in our gut, whether our parents smoked, our birth weight, the amount of TV we watch, the type of food we eat and have access to, our socio-economic conditions, and so on. We should not let the excitement surrounding genetic research and personalized medicine to distract us from the significant and wide-ranging social change that is required to make a real difference. ■