

## Media Release

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### We are what our parents ate, new research shows

Human cells have the ability to “remember” and replicate the effects on the body of a poor diet, providing a further clue as to why obesity and some diseases can run in families over generations.

Researchers at the Baker IDI Heart and Diabetes Institute have shown that very specific molecular events occur after the consumption of food high in glucose, causing chemical changes to our genetic controls. These changes continue beyond the meal itself, and have the ability to alter natural metabolic responses to diet.

The research team led by Associate Professor Assam El-Osta has found that a chemical change in the body initiated by a high-glucose diet can continue for up to weeks after exposure to the food. El-Osta's epigenetics laboratory is interested in determining how a finite period of good or bad metabolic control (diet) can have such long lasting effects later in life. It is increasingly appreciated that early metabolic environment is remembered later in life

“We now know that chocolate bar you had this morning can have very acute effects, and those effects continue for up to two weeks later, this is what we refer to as the burden of memory” Associate Professor El-Osta said.

“The changes initiated by diet create a kind of “ghost” that lives within our genes, and that these epigenetic changes remember the effects of glucose and continue to respond to them for days or even weeks.”

The effect is a small chemical mark initiated by an enzyme. This enzyme “writes” a histone code that exists above our DNA and that code is driving what is now referred to as “metabolic memory”:

Associate Professor El-Osta and his team found that cells that showed profound changes in a high-glucose environment continued to exhibit those changes even when taken out of that environment. In fact, the cells demonstrated a “memory” of that high glucose event even when the same cells were returned to their previous state.

Studies were conducted in human aortic tissue and in mice, with the same results.

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“Humans have only one genome and once the DNA sequence is written it doesn’t really change nor can we really control it, but, we actually have thousands of epigenomes which we can control, and, these epigenetics changes means what we eat and how we live can alter how our genes behave” Associate Professor El-Osta said.

“What we are specifically interested in is studying the epigenome – essentially sitting above the gene – and that does, and can, change from generation to generation depending on external influences. We are dispelling the notion of "good and bad genes", we now replacing this phenomenon with "good and bad epigenetics".

“As much as a poor diet can increase your chances of disease and the complication of diseases, we expect a continued good diet can help safeguard – “future proof”, if you like, future generations against the vagaries of environment.”

Associate Professor El-Osta said the research confirmed we all have a responsibility to our genes.

“Although the genome we inherit from our parents is fixed and does not change, the epigenome can be altered and this brings in hope that we can nurture our epigenomes for the future,” he said.

**For interviews with Associate Professor El-Osta contact Ebru Yaman, General Manager Media and Communications, Baker IDI Heart and Diabetes Institute: 03) 8532 1234 or 0488 380 484**