When the media hypes epigenetics, mothers take the blame

A whole host of things parents do – from what they eat to where they live – affect the wellbeing of their children, even before conception. We now know these can affect a person's biology and even their genetic inclinations.

Understanding epigenetics – modifications in how genes are expressed and behavior altered – can help prevent and treat genetic disorders at birth, but we have to be wary of placing too large a burden on parents, especially mothers, in trying to shape their children's health and development.

That is the concern voiced by a team of health and social scientists, writing in *Nature*, who warn that any conclusions drawn from studies at this time are premature, and reports such as this one in *Discover Magazine* titled "Grandma's Experiences Leave a Mark on Your Genes" feed a false understanding of current epigenetic research to the detriment of mothers.

> *DOHaD [Deveopmental Origins of Health and Disease] would ideally guide policies that support parents and children, but exaggerations and over-simplifications are making scapegoats of mothers, and could even increase surveillance and regulation of pregnant women. As academics working in DOHaD and cultural studies of science, we are concerned. We urge researchers, press officers and journalists to consider the ramifications of irresponsible discussion.*

They identified two major problems with the *Discover Magazine* article and a recent string of similar reports. The headline places inflated importance on the impact that a woman's personal life choices have on her progenies' health – a claim invoked in the past to justify restrictions on women's rights.

Second, they address the problem of extrapolating from animal studies. If a pattern appears to be significant in rats, as in a study linking maternal lead exposure to obesity, how do we know what it means for humans? We don't, because ethical constraints prohibit such a study in humans. And, as the *Nature* article explained, animal models in epigenetics studies are "poor proxies for human reproduction" because of their "short lifespans and large litter sizes."

Frances Champagne, a researcher at Columbia University who studies epigenetics in child development, states:

> *The thing I've gained from the work I do is that stress is a big suppressor of maternal behavior. We see it in the animal studies, and it's true in humans. So the best thing you can do is not to worry all the time about whether you're doing the right thing. Keeping the stress level down is the most important thing. And tactile interaction — that's certainly what the good mother rats are doing with their babies. That sensory input, the touching, is so important for the developing brain.*

This is the approach that, according to the authors in *Nature*, needs to be stressed in DOHaD reports on epigenetics. We have known that good health and supportive parenting really do matter since long before we found evidence of that at the genetic level. Fathers, too, have a part to play in their children's and grandchildren's epigenome: germline epigenetic changes in sperm cells might even allow memories of specific fears to pass from fathers to offspring for three generations.

We still don't really know how epigenetics works, much less what to do with the data we have – which often raises more questions than it answers. But distorted headlines that point a finger at moms or dads or grandparents misconstrue the purpose of epigenetics research. They place unfair blame on, among others, parents who can't afford to feed their family the most nutritious meals or move away from a highly polluted area.

Epigenetics is an extremely promising field, and it may eventually help answer a lot of riddles in the vast science of developmental biology. Until we know how to interpret it, though, speculating will probably only do more harm than good.

Additional resources:

- Do epigenetics reports unfairly target mothers? Popular Science
- Is epigenetics being exploited by the media? Genetic Literacy Project
- Shaking up science with transgenerational epigenetics and blurred species boundaries, Genetic Literacy Project