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Fear of a fat planet: closing the gaps in understanding obesity

That obesity is a growing epidemic with dramatic public health impacts is incontestable. What is becoming controversial is the degree to which it can be explained by appeal to diet and inactivity.

A growing trend of research is now focusing on how certain synthetic chemicals can disrupt the endocrine system, leading to the development of weight gain in adults.

The first study to explicitly propose a link between environmental contaminants and obesity was published in 2002 [J Altern Complement Med 8:185–92; Baillie-Hamilton].

The paper presented data which the author claimed could not be fully explained by lack of exercise and overeating, finding that food consumption trends do not reflect the growth of the obesity epidemic.

The paper also highlighted the limitations of the lifestyle hypothesis, observing that it is unable to account for evidence indicating the body's natural weight-control mechanisms are not functioning properly in obesity.

Early indications of the possible role of environmental contaminants in obesity were in incidental findings in research on the effects of early exposure to diethylstilbestrol (DES).

The research was into the carcinogenicity of the controversial miscarriage therapeutic. However, studies threw up incidental observations suggesting that early exposure to DES also had a significant impact on later weight gain.

Retha Newbold, developmental reproductive toxicologist for the US National Institute of Environmental Health Sciences, said: "In my own research, all of my animals got a lot bigger. As a matter of fact we had to modify some of the housing for these animals. This is something we have noticed for about thirty years."

Other research has demonstrated that prenatal exposure to chemicals such as plant phytoestrogens and bisphenol-A are also often followed by



Animal research is helping improve understanding of the biological mechanisms behind obesity—and how environmental exposures can interfere with them.

weight gain in the mice tested. Studies have also taken place into the effects of chemicals such as tributyltin and benzo[a]pyrene [FEBS Journal 273:1362–1372; Irigaray et al].

The suggestion of a link between chemical exposure and weight gain should not be entirely surprising, as synthetic hormones have long been used to deliberately induce weight gain in certain organisms, particularly in the instance of artificially fattening livestock animals.

One existing research programme which is developing these ideas is the International Society for Developmental Origins of Health and Disease (DOHaD).

Under the DOHaD paradigm researchers study how the environment can cause disease by influencing the developmental stages of an organism's growth. Reproductive cancers, cardiovascular diseases and lung disease have all been associated with environmental factors. Obesity is one of the latest diseases to be studied under this hypothesis.

Though a link in humans between chemicals and obesity has yet to be established, epidemiological studies in this area are increasing. A study published in 2008 into early exposure to the pesticide hexachlorobenzene showed that where the chemical was found in umbilical chord blood, children were twice as likely to be overweight by age 6. [Acta Paediatr. 97(10):1465-9; Smink et al]

OECD Health data show that, in 2005, 14.1% of the world population was obese.

MEDIA REPORTING MISSES KEY POINT OF ORGANIC STUDY

A recent systematic review of organic food was widely misrepresented in the media as concluding that eating organic has no health benefits.

The study, published at the end of July by the UK Food Standards Agency, looked at the evidence for differences in nutritional content between organic and conventionally farmed food.

The study found that conventional vegetables, dairy and meat had largely the same nutritional profile as their organic counterparts.

The researchers therefore concluded that, on the basis of nutritional value alone, there is no evidence that it is healthier to eat organic rather than conventional foodstuffs.

Many media outlets, including major UK papers such as the Daily Mail and the Times, reported this as the much stronger claim that organic food has no health benefits.

In fact, any such conclusion this was outside the parameters of the review, which did not examine the potential health effects of food contaminants such as pesticides.

Concerns about pesticide exposures and health persist, with recent studies connecting pesticides to neurological disorders, while a US study published in 2008 found that diet was the chief route of exposure of organophosphate pesticides for children.



France could be first European country to ban BPA

Nine lawmakers from the French Senate have tabled a bill which, if passed by the Parliament, would see bisphenol-A outlawed for use in food packaging.

The senators described the move as "precautionary", citing studies showing that BPA acts as an endocrine disruptor and has a possible role in obesity, diabetes and thyroid dysfunctions.

The proposal also referred to similar bans and restrictions on use in Canada, a number of US states, and moves by some plastic manufacturers to stop using the chemical.

The French government is developing a record of being active in environmental health issues. In June, the French food safety body AFFSA was instructed to re-evaluate its approval of BPA.

This move puts it ahead of any likely legislation in the EU, where the European Food Standards Agency says current exposure levels are safe and it does not see a need to revise this position.

The increasing number of legislative moves to restrict the sale of BPA are being met with opposition from industry.

Recently a US newspaper the Milwaukee Wisconsin Journal Sentinel ran an exposé of the communications strategies being used to defend BPA, describing the plastics industry as "[taking its] cue from tobacco companies' past tactics".

RECENT NEWS AND SCIENCE ABOUT THE ENVIRONMENT AND HEALTH

Screening cannot explain rising thyroid cancer rates: New research concluding there is more to rising rates of thyroid cancer than can be explained by improvements in screening. <http://tinyurl.com/screeningthyroid>

How chemicals can turn genes on and off: Detailed overview of epigenetics - the study of how chemicals can make permanent alterations to gene expression without directly damaging the DNA sequence. <http://tinyurl.com/genesonoff>

Canadian health authority reviewing pesticide use: Winnipeg Health Authority says it is likely to ban cosmetic use of pesticides on hospital sites. <http://tinyurl.com/hosppests>

Do nanoparticles in food pose a health risk? Very interesting piece on how nanotech marketing is outpacing US FDA safety testing, with hundreds of products now in use - even in baby food. <http://tinyurl.com/nanofoods>

What's getting into our children? The New York Times asks why cancer is now the leading killer disease for under-15s and other problems such as ADHD are becoming increasingly prevalent. <http://tinyurl.com/nytchildhealth>

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