

“The current U.S. food system works at odds with the health of children.”



* Robert Wood Johnson Foundation's *Healthy Eating Research Program*, University of Minnesota. **Wingspread Conference on Childhood Obesity: Healthy Living and Agricultural Policy**, March 2007. www.HealthyEatingResearch.org

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An *industrialized* food system

Industrialized agriculture. Defn:

The farm as a factory with “outputs” (corn, soy, animals) and “inputs”

Focus on
production,
yield



A food
environment of
bountiful
lots of
calories
low- priced,
high-profit
convenience food

Wallinga D. Today's Food System: How Healthy Is It? Journal of Hunger and Environmental Nutrition December 2009. 4(3,4).

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An *industrialized* food system

**Focus on
production,
yield**

Sources: Horrigan L. et al. 2002. Environ Health Perspect.; Walker P. 2005 . Public Health Nutrition; Lang and Heasman. 2004. Earthscan Press ; Wallinga D, et al, 2009. IATP.



- Intensive use of: **fossil fuels, antibiotics, heavy metals, farm chemicals**
- **Pollution, contamination risks**

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Source; David Wallinga, MD, IATP

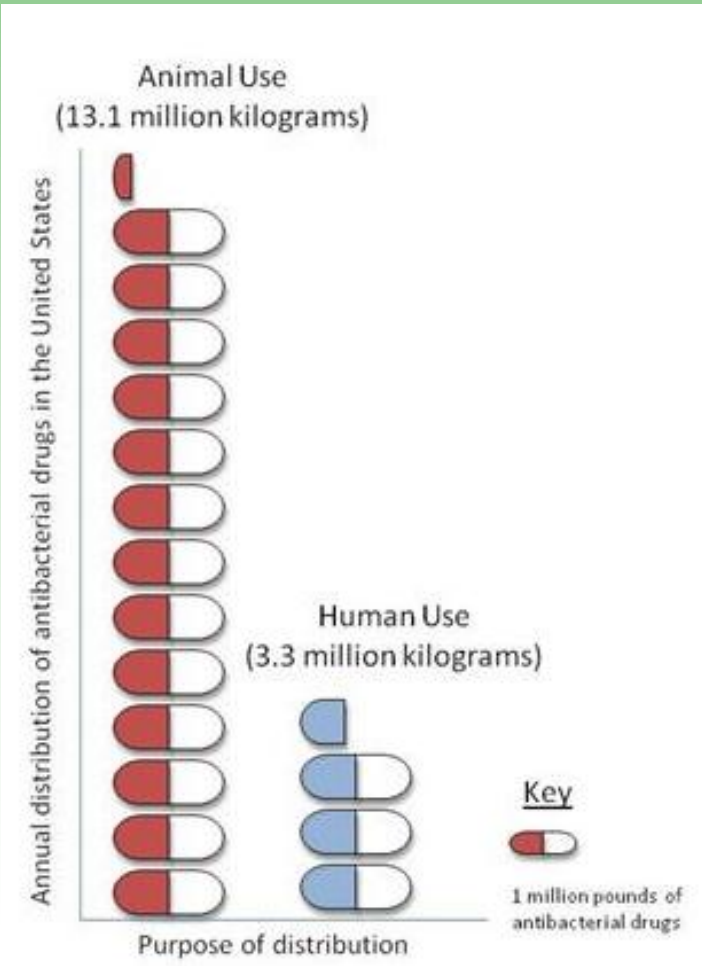
Industrialization

Yield promoting antibiotics, arsenenic in animal feed

“80% of all antibacterial drugs in the United States are being distributed for use on animals, not to protect human health.”

Only a small fraction are used to treat sick animals with diagnosed disease

Source: FDA, December 2010
Rep. Louise Slaughter, Dec. 2010



Food as source of toxic mixtures

Pesticides (**DDT**, **Organophosphates**)

Heavy metals (mercury, **arsenic**)

Plastic additives (bisphenol A)

Toxic organo-halogens

- PCBs
- Dioxins (90%)
- Brominated flame retardants?
- Perchlorate?
- Perfluorocarbons?

Synthetic food dyes



Orange = intentional use

Blue = *contaminants*

Neurotoxins & hormone
disruptors

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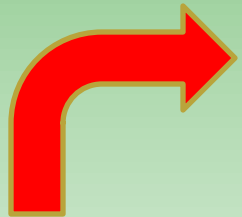
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Source; David Wallinga, MD, IATP

Understanding industrialization

Intensive packaging, processing

Plastic incineration recycling pollutants into the food chain



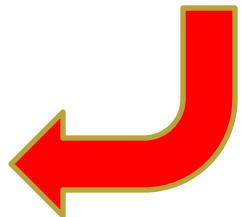
Toxic chemicals leached into food from packages



Food pollutants from manufacturing
[100 tons of BPA air released annually]



3000 FDA-approved food additives, “generally recognized as safe”



Source; David Wallinga, MD, IATP

Understanding industrialization

(Courtesy of Ted Schettler, MD)

Cellular mechanisms

**Nutritional/
Environmental
Factors**

Altered Pathways



**Chronic
Disease**

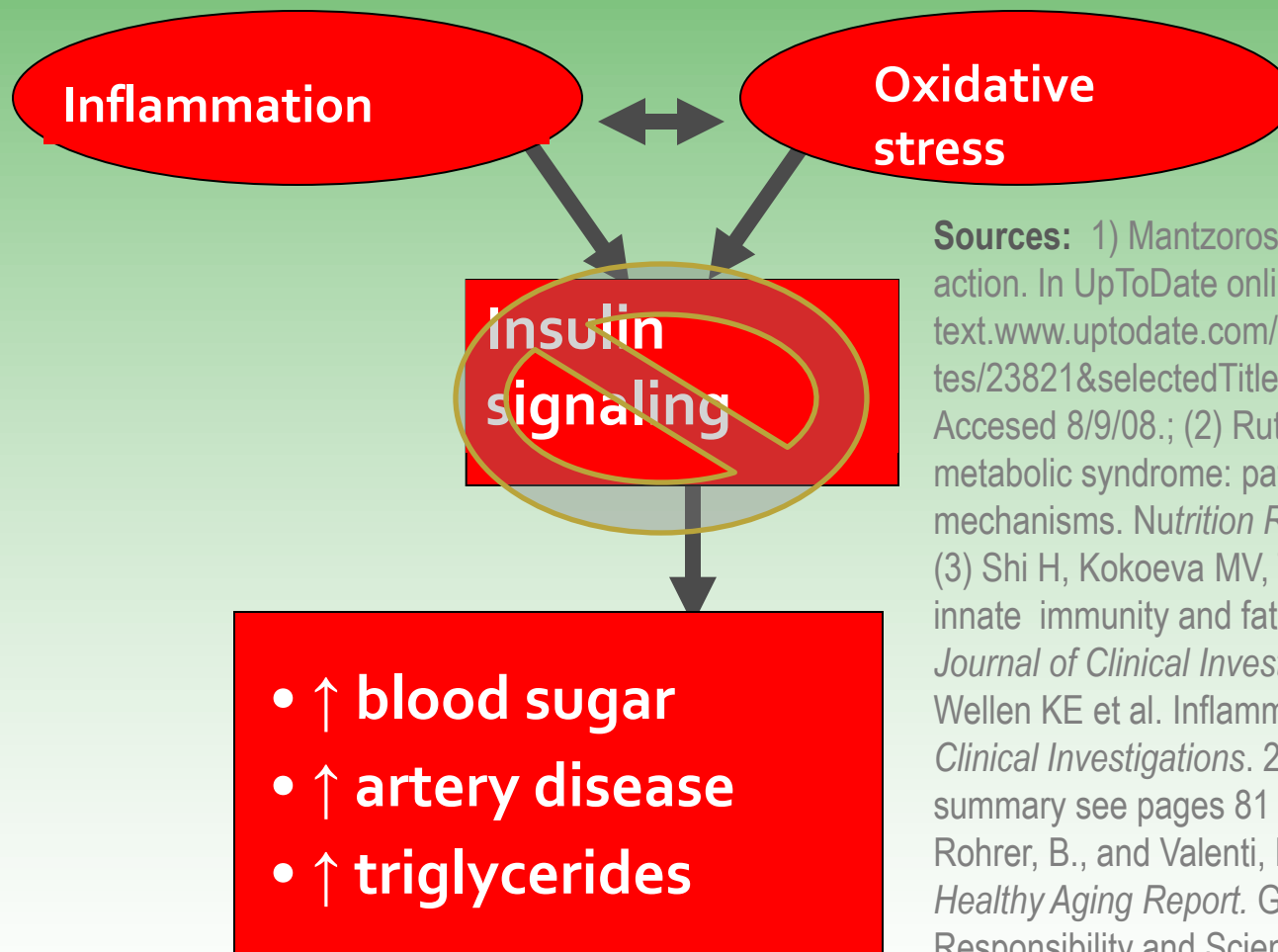
Mechanisms of Action

- ✓ Inflammation
- ✓ Oxidative Stress
- ✓ Disrupted Insulin Signaling

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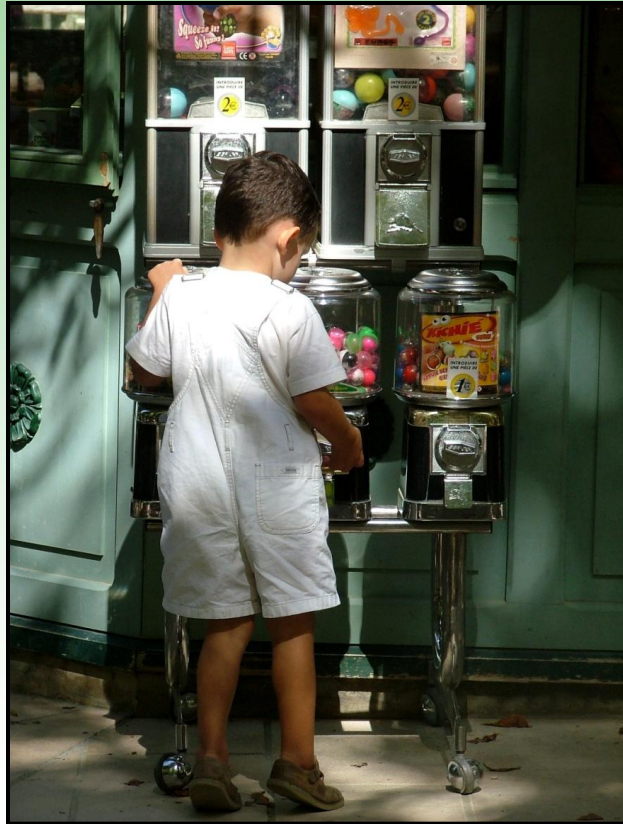
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Sources: 1) Mantzoros, Christos and Serdy, Shanti. Insulin action. In UpToDate online medical text. www.uptodate.com/online/content/topic.do?topicKey=diabetes/23821&selectedTitle=6~150&source=search_result Accessed 8/9/08.; (2) Rutledge, A et al. Fructose and the metabolic syndrome: pathophysiology and molecular mechanisms. *Nutrition Reviews*. 2007. June. 65(6)(II):S13-23.; (3) Shi H, Kokoeva MV, Tzameli I, Yin Flier JS. TLR4 links innate immunity and fatty acid-induced insulin resistance. *Journal of Clinical Investigation*. 2006. 116(11):3015-3025.; (4) Wellen KE et al. Inflammation, stress and diabetes. *Journal of Clinical Investigations*. 2005. 115(5):111-119.; (5) For a summary see pages 81 and 85 in Stein, Jill, T. Schettler, Rohrer, B., and Valenti, M. *The Environmental Threats to Healthy Aging Report*. Greater Boston Physicians for Social Responsibility and Science and Environmental Health Network. 2008. [/www.agehealthy.org/pdf/GBPSRSEHN_HealthyAging1017.pdf](http://www.agehealthy.org/pdf/GBPSRSEHN_HealthyAging1017.pdf)

Industrialization

A food system awash in *inflammation promoting* compounds



- Omega-6 / omega 3 fatty acids
- High glycemic carbohydrates
- Saturated fat

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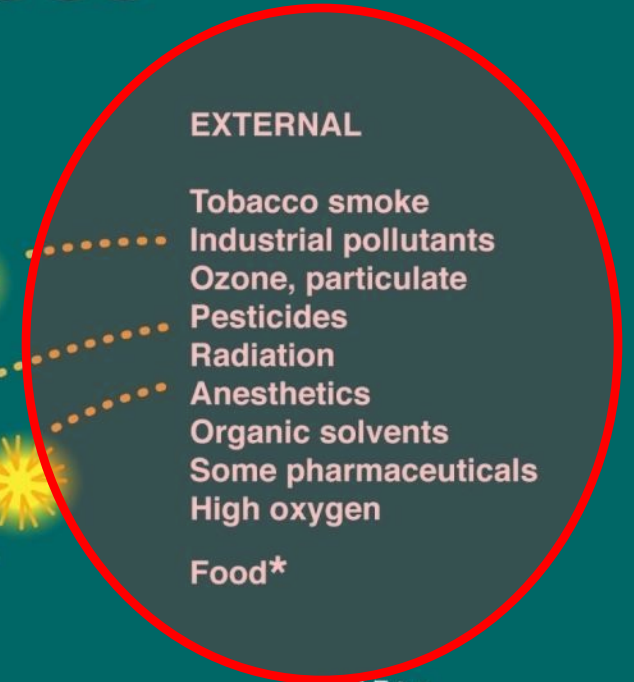
Oxidative Stress



INTERNAL

Mitochondria
Activated Immune Cells
(phagocytes)

Reactive Oxygen
Species
(ROS)



EXTERNAL

Tobacco smoke
Industrial pollutants
Ozone, particulate
Pesticides
Radiation
Anesthetics
Organic solvents
Some pharmaceuticals
High oxygen
Food*

ANTIOXIDANTS

*Sufficient antioxidants keep
this process in check.*

TISSUE INJURY

New thinking

Chemicals, food and epigenetics – what's that?

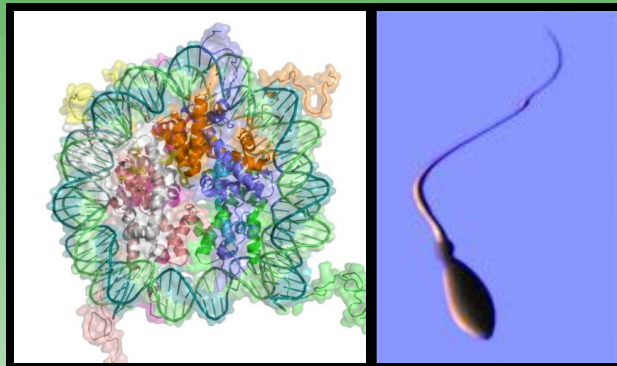
http://dels-old.nas.edu/envirohealth/newsletters/newsletter1_epigenetics.pdf

National Academies Workshop, July 30-31, 2009:

Use of Emerging Science and Technologies to Explore Epigenetic Mechanisms Underlying the Developmental Basis for Disease

Linda Birnbaum, Dir. NIEHS:

New findings suggest chemicals in our environment and in our food can alter genes, and “can lead to increased susceptibility to disease” such as to diabetes, asthma, cancer and obesity

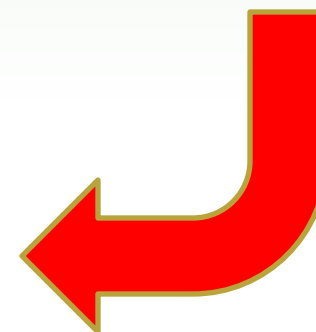
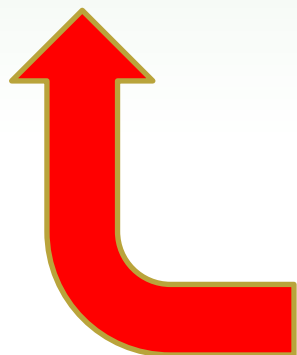


*From lifestyles to
lifecycles.....*

Chemicals & Food



“There is a huge potential impact from these exposures, partly because **the changes may be inherited across generations.** You may be affected by what your mother and grandmother were exposed to during pregnancy,” Birnbaum said.



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Healthy Food, Healthy Farms Webinars

Issues

[A healthy 2012 Farm Bill](#)

American's health should be at the center of the next federal Farm Bill, the country's largest and most influential piece of food policy. Re-negotiated every five years, the Farm Bill is up for approval in 2012 – but the debate has started already. Today's Farm Bill fails farmers and consumers alike. If our nation hopes for a new food system that is healthier and more sustainable, it can't happen without a Healthy Farm Bill. Healthy Food Action will pinpoint where health professional voices can make a difference.

[ISSUE RESOURCES](#)

[Banning arsenic from meat](#)

Of the nearly 9 billion chickens raised in the U.S. each year, most are fed arsenic compounds. This practice can leave arsenic residues in meat, in water and in the broader environment. Arsenic feed additives were never approved in Europe, and pose unnecessary health risks to Americans, as arsenic is, well, arsenic.

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