

The background features a gradient from green at the top to blue at the bottom. On the left side, there is a large, semi-circular scale with tick marks and numbers ranging from 150 to 260. Several circular patterns, some solid and some dashed, are scattered across the background, some with arrows indicating a clockwise direction.

WHAT DOES 'BIOCULTURAL' MEAN? THE INTERTWINING OF BIOLOGY AND CULTURE

ANTHRO 208 MEDICAL ANTHROPOLOGY

WEEK 3, 2020

HEATHER BATTLES

THE UNIVERSITY OF AUCKLAND

READINGS FOR WEDNESDAY DISCUSSION

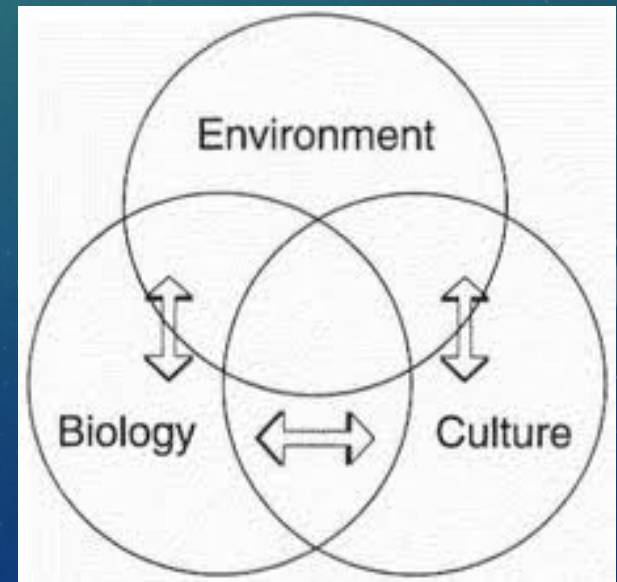
- **Joralemon**, Chapter 3: Recognizing biological, social, and cultural interconnections (pp. 26-37).
- **Hertzman C. & T. Boyce (2010)** How experience gets under the skin to create gradients in developmental health. *Annual Review of Public Health* 31: 329-347.
- **Thayer, Z. & C. Kuzawa (2015)** Ethnic discrimination predicts poor self-rated health and cortisol in pregnancy: insights from New Zealand. *Social Science and Medicine* 128:36-42.

OUTLINE – MONDAY LECTURE

- What is a biocultural approach?
- Assumptions of biological universality and normality
- Concepts and approaches: biological embedding and embodiment, life history, developmental origins of health and disease (DOHaD)
- Film: When the Bough Breaks (30 mins)
- In-class exercise

WHAT DOES 'BIOCULTURAL' MEAN?

- Since 1970s
- Kenneth Bennett and colleagues (1975:164): *“if there were a field of ‘biocultural ecology,’ it would ideally seek to transcend the fragmentation inherent in the separation of culture, human biology, and environment/ecology . . .*
- A holistic vision of anthropology
- Biology and culture as entangled – “inextricably intertwined”
- Narrow: How the social environment affects human biology
- Bidirectional and complex relationship



Andrea S. Wiley and Jennifer M. Cullin (2016) What Do Anthropologists Mean When They Use the Term Biocultural? AMERICAN ANTHROPOLOGIST 118(3):554–569.

WHAT IS A BIOCULTURAL APPROACH TO MEDICAL ANTHROPOLOGY?

- Human health/disease is intrinsically biocultural
- Considers the social, ecological, and biological aspects of health – and how these interact **within and across populations**
- Biological bodies do not exist in isolation from their ecological and socio-cultural milieu, shaped by **historical processes**
- Historical processes on local + global + evolutionary scales

Reference: Andrea Wiley & John Allen (2013) *Medical Anthropology: A Biocultural Approach* (Oxford University Press)

COMPLEX INTERACTIVE RELATIONSHIPS

- Beyond “cultural component X increase/decreases risk of disease Y”
- *We ask:* Why this particular disease? Why this particular cultural factor?

BODIES – CULTURE – HISTORY

Reference: Andrea Wiley & John Allen (2013) *Medical Anthropology: A Biocultural Approach* (Oxford University Press)

EPIDEMICS: CHOLERA IN PERU, 1991

Multiple theoretical lenses:

- **Biology and history –**

- Pathogen = bacterium: toxigenic *Vibrio cholerae*, varying serotypes
- Severe cases = profuse diarrhea and vomiting, muscular cramps, and collapse; can result in rapid death by fluid loss
- Very contagious; fecal-oral spread (via food/water)
- 400 years of cholera epidemics

- **Epidemiology –**

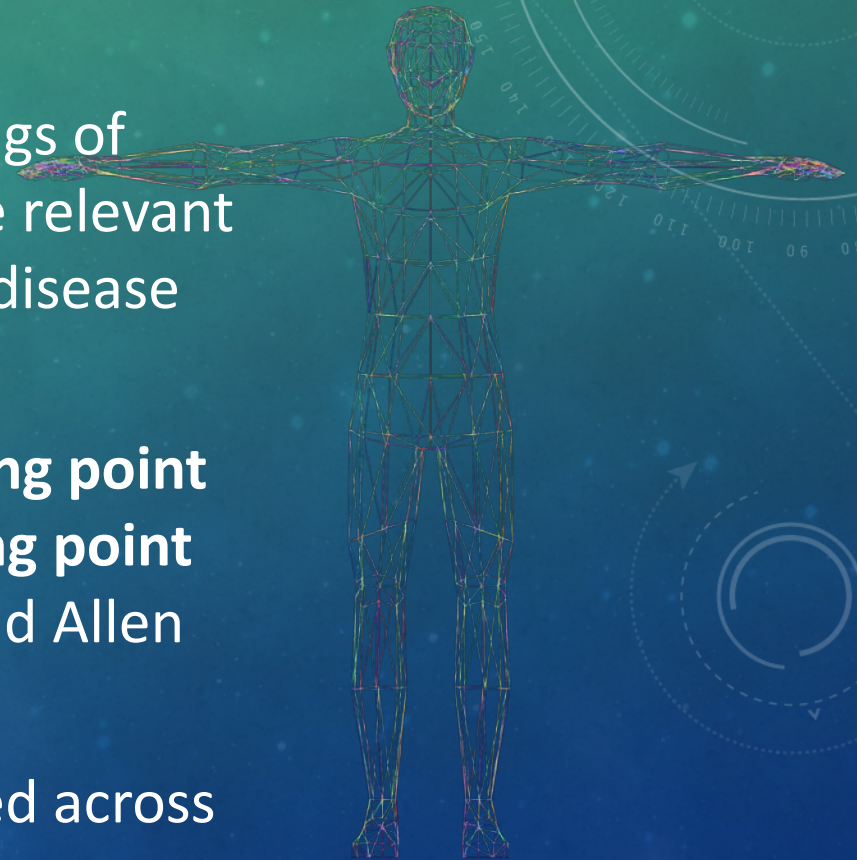
- diagnosis of pathogen responsible
- source(s) and mode of transmission
- who is affected
- effective control measures

- **Critical and interpretive perspectives –**

- Point to ultimate causes (political economy)
- Meanings (what, by whom, to what end?)

BIOCULTURAL ANALYSIS AND THE BODY

- Clinical biomedical understandings of disease privilege the body as the relevant environment for understanding disease causation
- Individual human body the **ending point** for biomedicine – but the **starting point** for biocultural analysis (Wiley and Allen 2013: 9)
- Human variation: some patterned across populations; some found among individuals within a single population



PROXIMATE VS ULTIMATE

	PROXIMATE CAUSE	ULTIMATE CAUSE(S)
Person with a fever	Bacterial infection	What factors put the individual at risk for a bacterial infection? Was there a lack of hygiene in their nursing home? Why was the person in a nursing home?
Person with trouble breathing	Lung cancer	Was the individual exposed to asbestos in their job as a demolition worker? How did they end up in that job in the first place?

ASSUMPTIONS OF BIOLOGICAL UNIVERSALITY AND NORMALITY

- Assumption of a universal human biology
 - Biomedical health standards (e.g. height-for-age, weight-for-age childhood growth charts)
- Concept of biological normalcy
 - The norm as desirable; abnormal requiring intervention
- Causes of biological variation between groups

CASE STUDY: IODINE DEFICIENCY SCREENING AND THYROID SIZE

- Iodine is important for metabolism, growth and development (esp. of the brain)
- Low iodine from diet -> hypothyroidism, fatigue, lower IQ
- New Zealand soils low in iodine; need fortified foods or consumption of seafood (high in iodine)
- Enlarged thyroid gland = 'goitre'
- Goitre indicates iodine deficiency



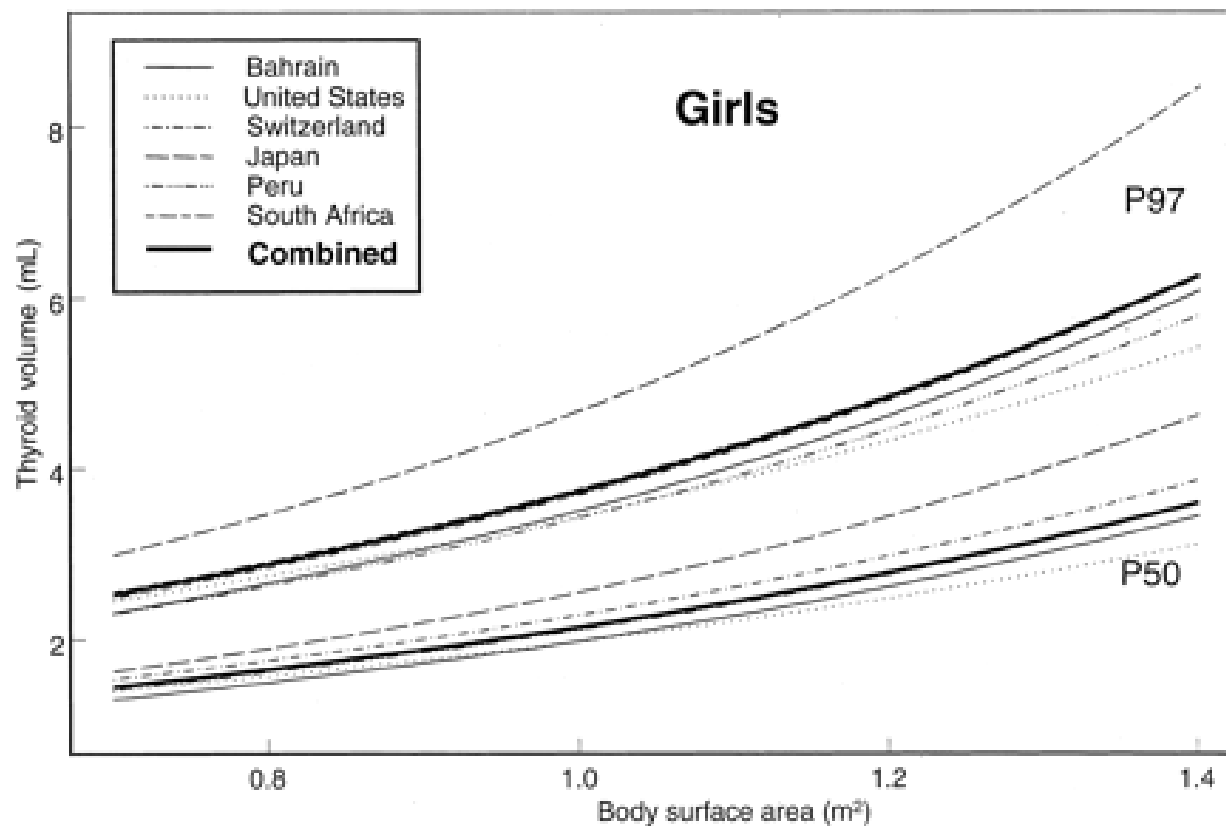
CASE STUDY: IODINE DEFICIENCY SCREENING AND THYROID SIZE

Age	Upper limit of normal thyroid volume			
	Boys		Girls	
	Benin	WHO/ICCIDD	Benin	WHO/ICCIDD
6	2.19	5.40	2.37	5.00
7	2.11	5.70	2.29	5.90
8	2.46	6.10	2.56	6.90
9	2.42	6.80	2.63	8.00
10	2.64	7.80	2.85	9.20
11	3.32	9.00	3.66	10.40
12	3.74	10.40	3.89	11.70
13	4.24	12.00	4.29	13.10
14	4.66	13.90	4.69	14.60
15	6.26	16.00	5.48	16.10
16	6.90		7.19	

Boys = $P < 0.05$; $df = 19$; $t = -4.570$ (significant difference between present study boys and WHO/ICCIDD boys for age) Girls = $P < 0.05$; $df = 19$; $t = -5.107$ (significant difference between present study girls and WHO/ICCIDD girls for age)

Marchie T T, Oyobere O, Eze K C.
Comparative ultrasound measurement of
normal thyroid gland dimensions in school
aged children in our local environment.
Niger J Clin Pract 2012;15:285-92

FIGURE 4. Site-specific and combined median [50th percentile (P50)] and 97th percentile (P97) values for thyroid volume ...



AREAS OF INQUIRY IN BIOCULTURAL MED ANTHRO

- Mismatches between modern environment and environment of evolutionary adaptiveness (EEA)
- DOHaD (developmental origins of health and disease) – also known as Barker hypothesis
- Infectious disease emergence and epidemics
- Diet and nutrition in health and disease
- Reproductive health
- Aging
- Health disparities and the role of social stress
- Mental health

RECENT POSTGRAD STUDENT BIOCULTURAL RESEARCH PROJECTS

- Skeletal indicators and their relationship to critical periods of childhood
- Gender as a mediator of micro-organism exposure and atopic disease in New Zealand preschool children
- A syndemic perspective on the synergism between asthma, respiratory infections, and pollutants
- The local biology of child oral health in Northland, New Zealand
- A biocultural analysis of the relationship between stress and social support in a group of migrants in Auckland
- A biocultural approach to experiences of stress within children's classroom peer ecologies
- The experience of having a genetic metabolic disorder for children and their families
- Infant feeding variation and decision making



EVOLUTIONARY AND DEVELOPMENTAL PERSPECTIVES

LIFE HISTORY, CRITICAL PERIODS, FETAL PROGRAMMING, AND EPIGENETICS

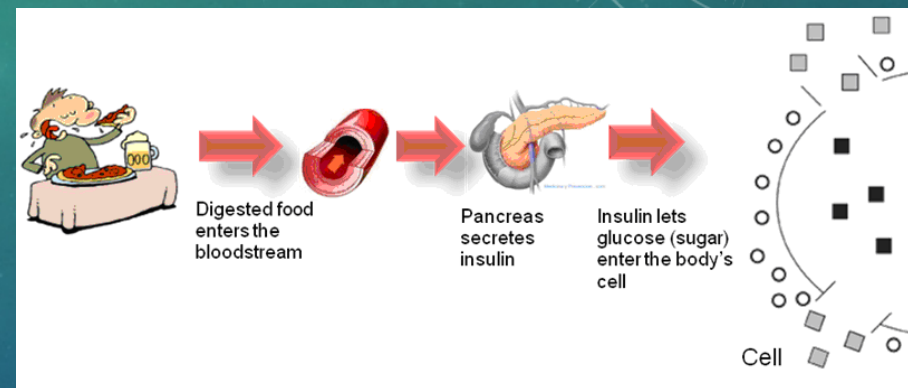
DIABETES AND THE THRIFTY GENOTYPE HYPOTHESIS

- Geneticist James Neel's hypothesis:
 - Hunter-gatherer ancestors would have experienced alternating periods of food abundance vs scarcity
 - Ability quickly release a lot of insulin in response to glucose in blood = **evolutionary fitness advantage**
 - Able to efficiently convert glucose to storable fat
 - More fat (energy reserves) for periods of scarcity



DIABETES AND THE THRIFTY GENOTYPE HYPOTHESIS

- **Problem today:** “thrifty genotype” detrimental when food (especially carbs/glucose) continually available
 - high levels of insulin continually produced → **insulin resistance**
- Not all populations equally prone – e.g. higher rates of obesity and Type 2 diabetes in Native North Americans
 - **Example: the Pima (SW US vs Mexico)**



DIABETES AND THE THRIFTY GENOTYPE HYPOTHESIS

- **Why would Europeans not have “thrifty genotypes” too?**
- Allen and Cheer (1996) hypothesize that northern Europeans consumption of milk selected against thrifty genotypes
 - Milk stimulates large rise in blood insulin levels
 - Individuals with a thrifty genotype who drank a lot of milk would develop diabetes earlier, probably die earlier
 - Thrifty genes would be eliminated from population

DIABETES AND THE THRIFTY GENOTYPE HYPOTHESIS

- **Critique:** Were hunter-gatherers really more prone to food shortages?
 - Agriculturalists more likely to experience famine

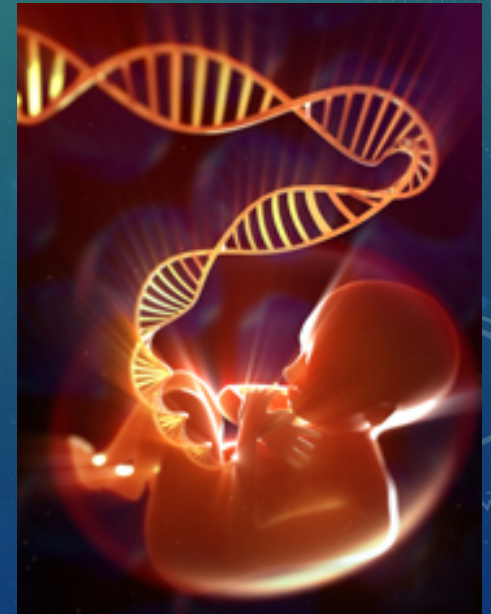


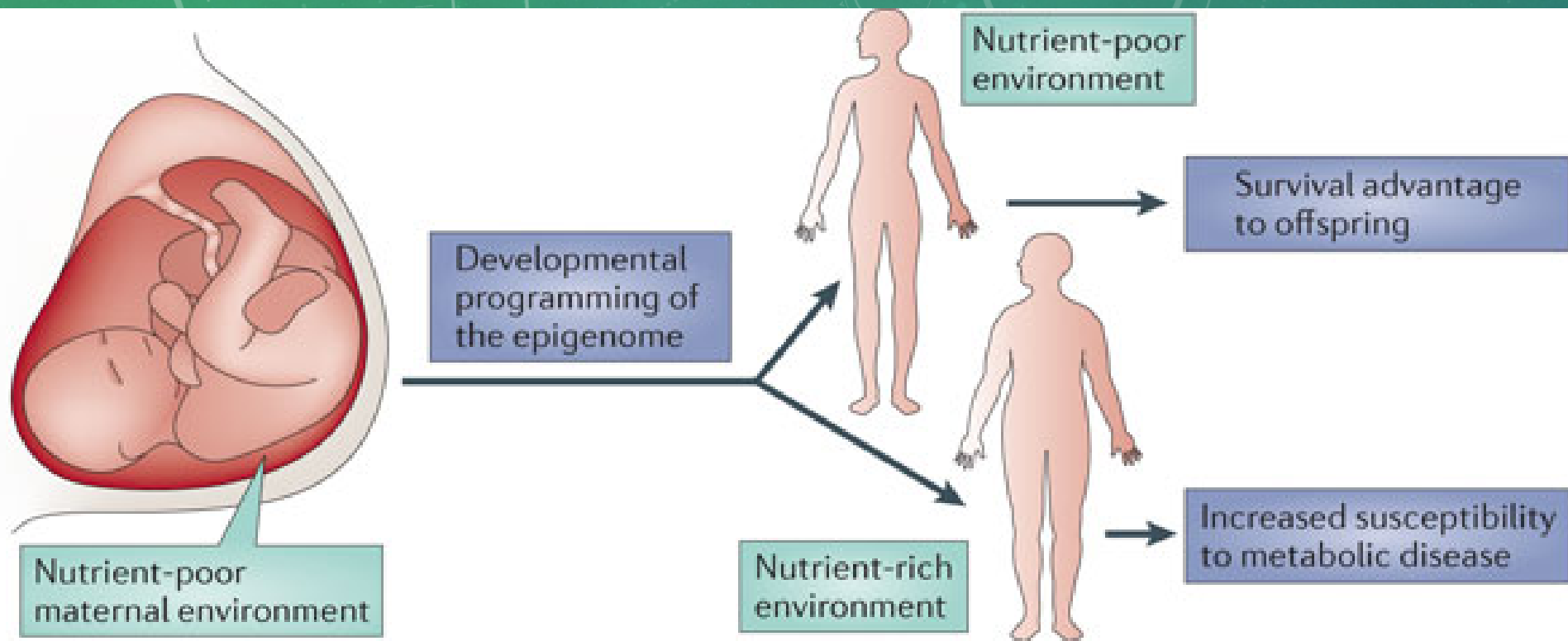
Not wholly genetic – triggered by environment

Poor, marginalized groups disproportionately vulnerable

FETAL PROGRAMMING

- Developmental origins of health and disease
 - **Key idea:** Human phenotypes contain **plasticity**
 - Intrauterine environment can shape suite of responses
 - This underlies the “**thrifty phenotype hypothesis**”
 - **Miss-match** between environment during gestation and later life



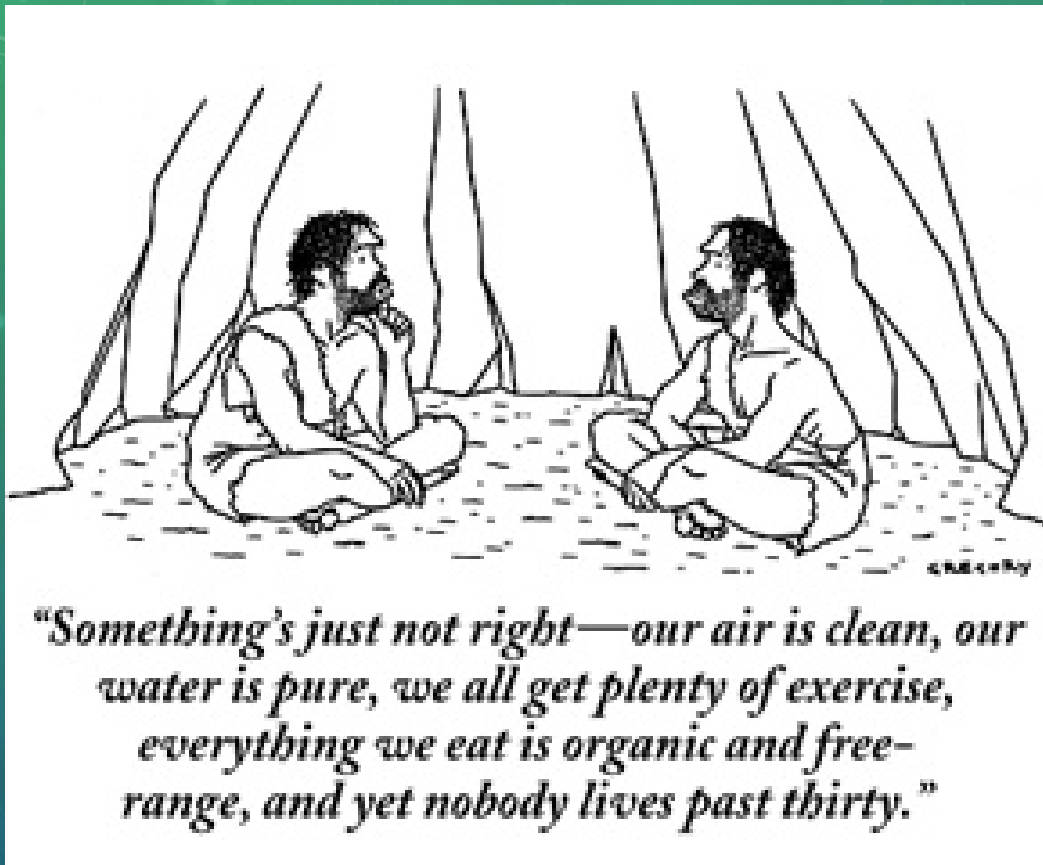


FETAL PROGRAMMING & EPIGENETICS



Emmy Andriess, Boy with pan on his way to a soup kitchen food distribution, Amsterdam, spring 1945. Coll. JHM

- Dutch Hunger Winter (“Hongerwinter”) 1944/45
- Famine as German blockade cut off food and fuel
- Dutch Famine Birth Cohort Study
- Children of women pregnant during famine more prone to obesity, diabetes, other health problems
- Possible transgenerational epigenetic effects – second generation also affected



- **Adaptation** to certain conditions, effects of trauma → potential problems in later life (lifecourse; developmental origins of health and disease aka DOHaD), transgenerational effects (epigenetics)

BIOLOGICAL EMBEDDING VS EMBODIMENT

Biological embedding

- Hertzman & Boyce: *“the processes by which human experience alters biological processes in stable and long-term ways that influence health over the life course.”*
- **Biological** explanation/process; **an event**

Embodiment

- Krieger & Davey Smith: *“How social influences become literally embodied into physio-anatomic characteristics that influence health and become expressed in societal disparities in health.”* (p. 92)
- **Biosocial/biocultural** process; **continual**