Course description. Although often framed as a recent idea, the idea that conditions during early life may have long term influences on adult physiology and health are not new. Although popularized as a disease model, whereby nutritional insults during development alter risk of adult onset, chronic diseases such as diabetes, obesity, and cardiovascular disease, this interpretation serves to limit the actual production of variation in human physiology. This course will move beyond disease models to investigate how nutrition, growth, and stress in early life (gestation, infancy, early childhood) contribute to the establishment of long term physiology and variation in human health. Developmental plasticity will be considered in an adaptive, evolutionary framework salient to human biological variation.

Reading schedule

The course is organized around early life exposures and adaptation. Outcome measures that you may be more familiar with – cardiovascular disease, obesity, diabetes, and the metabolic syndrome, will be discussed throughout the course and reflect bridging themes. We will spend several days specifically looking at mechanisms in epigenetics and plasticity, as well as a day specifically discussing physiological changes associated with different disease outcomes.

Week 1: Overview of the course and developmental plasticity

August 27: Introduction, review of syllabus, in class response

Paul AM. 2010. How the first nine months shape the rest of your life. Time Magazine.

August 29: What is developmental plasticity?

Note: read in this order (chronological).


**Week 2: Acquired skills and the phenotype**

*September 3:* Last names A-M attend library workshop

Last names N-Z: In class workshop on article evaluation and PBLs

*September 5:* Last names N-Z attend library workshop

Last names A-M: In class workshop on article evaluation and PBLs

Mismatch (book): Chapter 1

**Week 3: The Phenotype in an evolutionary perspective**

*September 10: Evolutionary models*

Mismatch book: Chapter 2


*September 12: The phenotype*


**Week 4: And How? CpG islands, methylation**

**September 17: Of mice and men?**


**September 19: the mechanics of methylation and CpG islands**


**Week 5: Nutrigenomics**

**September 24: An eye to development**

*Mismatch (book): Chapter 3,4*

**September 26: Theory and physiology**


**Week 6: Fetal Programming**

**October 1: The model**


**October 3: Hormones at play**


**Week 6: Placental size and birth weight**

**October 8: Placental transport**


**October 10: Fetal origins**

Meas T. 2010. Fetal origins of insulin resistance and the metabolic syndrome: a key role for adipose tissue? Diabetes Metab. 36(1):11-20


Week 8: Postnatal feeding & growth

October 15: Feed me! (Or not)


October 17: Infant feeding


Week 9: The problem of catch up growth: Interactions between pre- and post-natal growth

October 22: Other postnatal factors


Mismatch book: Chapter 6

October 24: The microbiome


Week 10: Adult outcomes: Cardiovascular disease, Type 2 diabetes, and obesity

October 29: Catching up and creating metabolic consequences


October 31: Cardiovascular disease & diabetes


Mismatch (book): Chapter 7

Week 11: Health disparities

November 5: Introduction to health disparities


November 7: Health disparities


Week 12: Intergenerational effects

November 12: Theory


November 14: Data


Week 13: Stress programming
November 19: *Mental health and stress programming*


November 21: *Maternal stress and offspring metabolism*


*Weeks 14: Telomeres & Thanksgiving*

November 26: *Telomeres*


November 28: *Thanksgiving Day – NO CLASS*

*Week 15: Developmental plasticity and transitional economies*

December 3: *Developmental plasticity and emerging public health problems*


December 5: *Wrap up*


Assignments

Participation (12%). Read. Attend. Talk. Each week of class is worth 1% of your grade. Please attend class, and come prepared having done the readings. I will update your participation grade in Blackboard at the end of each week. If you have difficulty speaking in class, you may submit additional prompts/comments/questions to the online forum in Blackboard. You get a free pass for the first week and Thanksgiving!

Problem based learning (75%). You will be expected to write 5 problem based learning case studies. Each PBL is worth 15% of your grade. Each PBL will have a separate deadline. PBLs should be 5-7 pages in length and include a minimum of 3 references, at least one of which must be outside the required course material. PBLs will be evaluated using a generic rubric available on Blackboard. The library has a course website specifically for us designed to help you with these PBLs; please use this as a resource!

Article evaluation (13%): You will be required to do a 3 page article evaluation/review, following the guidelines discussed in class. We will spend half a class meeting discussing how to evaluate and review articles; you will then select your article from a list and write a review. This is, in my opinion, an incredibly important skill – one that will serve you well in future courses, or medical/professional school. If you don’t believe me, believe your peers; I have been repeatedly told that this activity was incredibly helpful for medical school – and if people take the time to email after they have graduated to discuss an assignment, that is proof enough for me!

Online forum. We will have a place on the Blackboard site where you can post prompts, questions, or thoughts you have on the material. This is a quasi-public forum – it is only visible to members of our class. You should be respectful of one another in this space and consider it a continuation of the classroom environment. This is a resource for you to continue to think about the material, and see what questions or comments your classmates may have on the material as well.

Papers can be submitted in hard copy or electronic (through Blackboard) form.

Assignment Schedule – all papers are due at 2:40pm (start of class) on the day indicated.
Thursday, September 12: Article review/evaluation due
Thursday, September 26: PBL #1 due
Thursday, October 10: Revisions to PBL #1 due (NOTE: this is the only revision allowed)
Thursday, October 17: PBL #2 due
Thursday, November 7: PBL #3 due
Thursday, December 5: PBL #4 due
Tuesday, December 17: PBL #5 due (in lieu of a final)

Other important information
Writing particulars. I too can Google. I will Google suspicious sentences, or will run papers through Turnitin.com/SafeAssign if I need to. Please do not plagiarize! If you think you might be plagiarizing, look it up in your student handbook, or email me. That said; please make sure to properly reference any materials in your writing. Reference style should be in APA or ICMJE format; references must be properly cited in the text and the full citation included in a reference list at the end.

APA: http://www.apastyle.org/

ICMJE: http://www.nlm.nih.gov/bsd/uniform_requirements.html

Size, margins, and fonts. Margins should be 1 inch. Please stick to the familiar fonts: Arial, Times New Roman, Calibri and avoid any brush/handwriting type fonts. Please use font size to 11 or 12 – Melissa and I can’t read the itty bitty fonts.

Lateness, submission, and other concerns. You are eligible for one 24 hour no cost extension. That means you can turn one paper of your choosing in 24 hours after it is due with no penalty. Use this wisely. Subsequent delays will result in a loss of 2pts for day 2, and 5 points per day for each additional day beyond day 2. Your ability to choose what papers to write allows you to manage your time – please plan accordingly. On all other papers, late submissions will be accepted. Up to one day late will result in a loss of 2 points, 2 days the loss of an additional 2 points, and then 5 points per day for each additional day beyond day 2. Online submission is accepted and encouraged – so yes, weekends count.

Graduate student requirements. Graduate students will have additional requirements. An individual term paper, on a topic of the individual’s selection, will be substituted for the PBLs. Additional readings will also be required, with a separate time established monthly for discussion. Readings will be drawn from the two texts listed below – but don’t worry, we won’t read the entire West Eberhard.


The technical portion and university policies.

Syllabus. I reserve the right to modify the syllabus to reflect the changing needs of the class. Sometimes, I will hold in class votes or send out email links asking if we need to adjust schedules/deadlines etc. Please respond and the syllabus will be changed to reflect these new decisions. As developmental research is a very hot area right now, new material that becomes available may be added to the course and older material removed. Fingers crossed that something new and cool comes along!

Plagiarism. The material below is taken directly from the Washington University in St. Louis Student Bulletin, with the sections not relevant to this course removed. Please refer to your Student Handbook
with additional questions. If you think you might be plagiarizing, feel free to ask me. There are no penalties for asking, there are for submitting plagiarized work.

Please contact me if you have any questions regarding course content, material, or policies. I am always happy to answer questions and discuss specifics of the material.