

Evolution and Development of the Face

MCB DeCal-Fall 2013

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Course overview and learning objectives: Students will learn about the cellular and genetic basis of head development and how these developmental patterns are changed through evolution to produce variation. The course readings will combine review articles and primary literature in the fields of developmental biology and evo-devo. Papers exploring the developmental mechanisms of craniofacial morphogenesis will be paired with papers exploring how evolution has varied these signaling networks to generate novel morphology. Each meeting will consist of a student-led discussion of primary literature.

Grading and expectations: Students are expected to attend class regularly and participate in discussion. Each student will be required to lead a discussion on one of the assigned papers. The expectations for these discussions will be reviewed on the first day of the course. The final assignment will be a two-page written research proposal based on primary literature (either a paper assigned in class or a paper of the student's choosing). More details about the assignment will be distributed midway through the semester. Attendance and participation will account for 50 points of the final grade; the presentation and proposal will each count as an additional 25 points. Students must attend a minimum of 8 of the paper discussion meetings and earn 70% of the total possible points to earn a passing grade. Additional absences must be approved by the instructors in advance.

Week 1	9/3	Course expectations and overview; introduction to how to read a paper
Week 2	9/10	Introduction to presenting papers: Pigeon crests Reading: Shapiro et al 2013 http://biologylabs.utah.edu/shapiro/Shapiro_Lab/pdf_pubs/Shapiro_2013_Science.pdf
Week 3	9/17	Fate of cranial neural crest: qucks and duails. Reading: Schneider and Helms 2003 http://www.sciencemag.org/content/299/5606/565.full.pdf
Week 4	9/24	BMP levels shape mouse craniofacial development: Reading: Bonillo-Claudio et al 2012 http://dev.biologists.org/content/139/4/709.long
Week 5	10/1	Developmental basis of Darwin's finch beak variation: Reading: Abzhanov et al 2006 http://www.oeb.harvard.edu/faculty/abzhanov/pubs/Abzhanov_et_al_2006_Nature.pdf
Week 6	10/8	Regulation of BMPs in craniofacial cartilage development: Reading: Dalq et al 2012 http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0050140

- Week 7 10/15 Adaptive evolution of the cichlid jaw:
 Reading: Albertson et al 2005
<http://www.pnas.org/content/102/45/16287.full.pdf+html>
- Week 8 10/22 Craniofacial variants in domestic dogs
 Reading: Schoenebeck et al 2012
<http://www.plosgenetics.org/article/info%3Adoi%2F10.1371%2Fjournal.pgen.1002849>
- Week 9 10/29 Runx2 tandem repeats shape mammalian snouts
 Reading:
<http://onlinelibrary.wiley.com/store/10.1111/j.1525-142X.2007.00196.x/asset/j.1525-142X.2007.00196.x.pdf?v=1&t=hl83zduo&s=8cb421dd2631eb9ce3c699e986e8d78e7c16d010>
 but see also: Pointer et al 2012
<http://www.biomedcentral.com/content/pdf/1471-2148-12-103.pdf>
- Week 10 11/5 Adaptive evolution of primate facial variation
 Reading: Santana et al 2012
<http://rspb.royalsocietypublishing.org/content/279/1736/2204.full.pdf+html>
- Week 11 11/12 Sexual selection and testosterone in facial attractiveness and behavior
<http://www.nature.com/nature/journal/v394/n6696/pdf/394884a0.pdf>
 and
<http://rspb.royalsocietypublishing.org/content/279/1728/571.full.pdf+html>
 and
http://www.larspenke.eu/pdfs/Lefevre_Lewis_Perrett_Penke_in_press_-_fWHR_and_reactive_T.pdf
- Week 12 11/19 Pax3 in neural crest development
 Reading: Milet et al 2013
<http://www.pnas.org/content/110/14/5528.short>
- Week 13 11/26 Human facial variation: Pax3 and eye spacing
 Reading: Paternoster et al 2013
<http://www.sciencedirect.com/science/article/pii/S000292971200002X>
- Week 14 12/3 Wrap up/proposal discussion