**7/31/19**

Meiosis can be reduced to the expression of (2n -> 4n -> 2n -> 1n) which tracks the duplication of a diploid genome into haploid cell products. The meiotic program relies on crossovers and the process of recombination to ensure the correct separation of chromosomes. Under one of the most common forms of sexual reproduction, anisogamy where a species has distinct gametes, there is no first principle which would predict the evolution of sexually dimorphic recombination rates. Yet sexual dimorphism for this trait, called heterochiasmy, is commonly observed in dioecious species, suggesting that other meiotic traits which distinguish the gametes, for example symmetrical vs asymmetrical cell division, may impose selection for sexually dimorphic recombination rates.

Notes:

Anisogamy may just refer to the gamete shape – while recombination doesn’t happen in gametes – it happens in cells upstream of gametes.

The first sentence is sorta general / abstract compared to later sentences that get more detailed.

Things to keep, Meiotic program, no first principle, (it is surprising that heterochiasmy exists given that the meiotic program is conserved)

“by meiotic program I mean”

(outline)

Intro

Gap (not enough within species) / questions

Angle

Background

-prev hetC lit: (Lenormand, BurtBellOther, Shapley,)

-HetC theories: (Brandavain, Trivers 🡪 Lenormand, Sardell-Kirkpatrick, (hulten? Handel?)

-wild pops / genetic diversity and within species measures

-(my pero refs, honey bee RR,

# Questions (angle)

-Within species measures (polymorphism) (fitting hypotheses)

-more sex data // hetC long documented but not solved

-why hetC?

a. distinguish between primary causes being due to indirect or direct selection (pop gen or functional aspects common to anisogamy)

b. long documented not solved

c. (misconceptions about genetic diversity assuming single rate / male only pattern)

# Outline

Defining HetC

-Both sexes recombine,

-overall number

- anisogamous species (sperm and egg) / Celegans (hermaphrodite) dioecious species

HetC patterns

-female higher // but limited ~60% of species are within this range, X percent no difference in overall number

-bivalent level patterns

Defining evolution of HetC

one sex varies – other is static

Meiosis pathway – which part evolves / contributes to sexual dimorphism?

(this is what we did statement)

Sex specific measures for heterochiasmy

Tests / a couple models for evolution of heterochiasmy

-cell size difference

-DSB and percursors

- (tension force / amount of tension force at metaphase) – maybe chapter 3

**Aim 2, *Sexual dimorphism in genome-wide recombination rates within* Mus musculus**

The genome-wide recombination rate is a fundamental genomic parameter. Meiotic recombination facilitates proper chromosome segregation and creates novel genetic diversity. Sexual dimorphism in recombination rates is termed heterochiasmy. In dioecious species where both sexes recombine, often females have higher genome-wide recombination rates (i.e. female-biased heterochiasmy). However there are numerous examples of male biased heterochiasmy have been documented across species, suggesting that the direction and magnitude of heterochiasmy evolve.