

Selection: The process by which agents in a species environment facilitate the **fitness** of one individual over another due to their genetic attributes

Fitness: The number of successful offspring left to the next generation

Evolution of Reproduction:

Asexual cloning

Sexual

Isogamy: both gametes the same size Released flagellated gametes

Anisogamy: two kinds of gametes of different sizes

One type (sperm) fertilizes other
type (egg)

Egg (female)

1. "Stays home"
2. Gamete that provisions embryo with food and protection
3. Large in size
4. Expensive and few

Sperm (male)

1. Released to "find egg"
 2. Gamete that is mobile and carries little but haploid number of chromosomes
 3. Small in size
 4. Inexpensive and numerous
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Sexual Selection: inter-individual differences in reproductive success caused by competition for mates as a result of genetic-based traits

Strongest selection occurs on the sex that competes the most (usually males) for the more limited sex (usually the female)

Males (usually) exposed to two types of sexual selection

Inter-sexual selection: male reproductive success driven by attractiveness to potential mates (female choice)

Intra-sexual selection: male reproductive success driven by access to mates through male-male interference (male contests)

Sexual interactions are not cooperative, but earmarked by conflict

Sexes looking for something different

Unequal playing field:

Males have huge supply of inexpensive gametes, frequently with little mandatory parental care costs – select for **unchoosy, quick arousal** males looking for **maximum number of mates**

Females have limited number of expensive gametes, usually costly behaviors for parental care – select for **choosy, wary** females looking for **good genes and resources for offspring**

Example of **unequal parental investment** – Humans:

Egg 80,000 times larger than human sperm

One egg ovulated / month compared with millions of sperm / day

Gestation and lactation mandatory costs on female not shared by male. These parental costs alone represent one quarter ton of lipids

Mating systems

Polygamy (one sex has more than one mate)

 Polygyny (male has more than one mate)

 Polyandry (female has more than one mate)

 Polygynandry (both male and female have multiple mates)

Monogamy (one male bonded to one female)

 Social monogamy

 Genetic monogamy

 Perennial monogamy

 Annual monogamy

 Serial monogamy

Promiscuous (potentially multiple mates for both sexes with no evidence of bonding)

Sexual Dimorphisms

 physical morphology (e.g., body size)

 physiology (e.g., muscle metabolism)

 hormones (e.g., estrogen, androgen)

 neurology (e.g., bird singing centers)

 behavior (e.g., territoriality, nursing)

Most evident as sexual roles diverge

Usually female is 'default' baseline for species

Usually males show exaggerations for either:

1. Attracting opposite sex
2. Intimidating other males for access to females