

Evolution

- changes in a gene pool over time.
- heritable characteristic
- adaptation / adaptive radiation
- natural selection ("survival of the fittest")
- selective pressure

Lamarck

- use and disuse
- ① change in environment leads to ② an individual's change in traits. ↓
passes trait to offspring

Darwin → natural selection

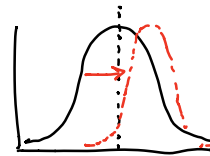
"survival of the fittest"

↓
until reproductive age

↓
ability to produce viable offspring that survive to reproduce.

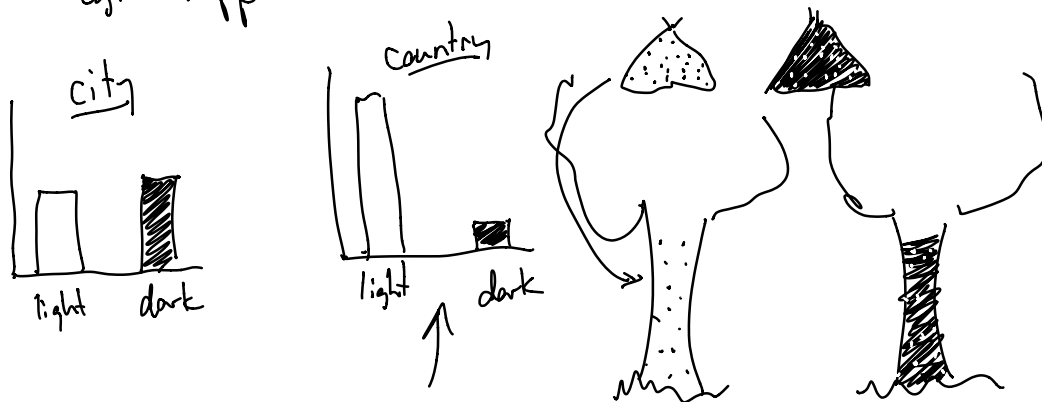
① Variation

② Selective pressure

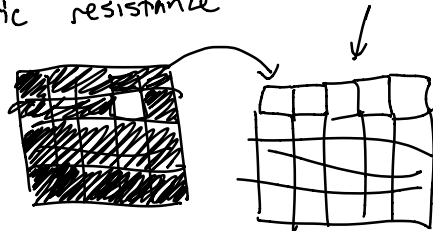


→ sexual selection
↳ mate choice.
↳ peacock

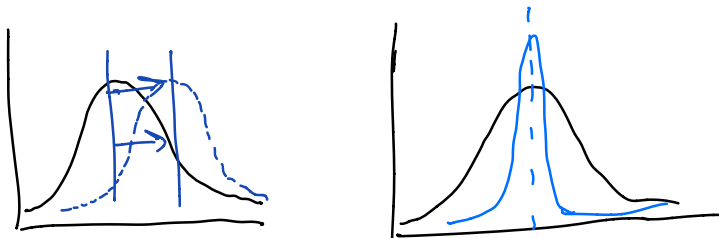
eg. Peppered moth → two variants



Antibiotic resistance



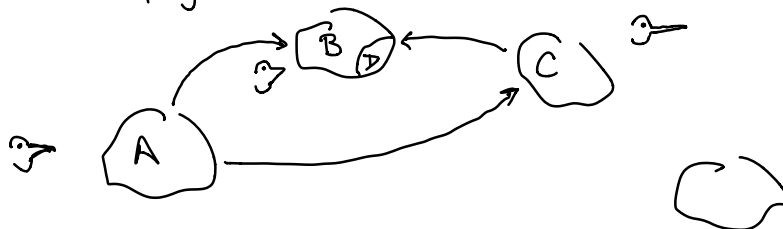
Human height → continuous variation → polygenic
8' 11"



→ natural selection TENDS
to reduce frequency of
extremes. → reduces
variation.

Speciation → Allopatric speciation
(adaptive radiation)

Gblapagos Islands → "Darwin's Finches"



"Ecological niche"

① geographic isolation → ② reproductive isolation.

$\begin{array}{ccc} \underline{4} & \rightarrow & \underline{8} \\ \downarrow & & \downarrow \\ \text{gamete } 2 & \times & 4 \end{array} \rightarrow \text{polyploidy}$

Key Idea

- variation does NOT come about in response to selective pressure → it must pre-exist.

→ variation comes from

- mutations → new allele

- sexual reproductions → new combinations of alleles.

Evidence for Evolution

① Fossils

→ sediments bury stuff in layers

→ hard bits fossilize

→ record is incomplete.

→ absence of intermediate

→ Archaeopteryx

→ Cambrian explosion

↳ 540 mya

↳ sudden appearance of many new forms

K-T boundary

punctuated equilibrium

↳ 15 my

IN GENERAL → progression from primitive to complex/modern forms as you go up rock layers.

② Selective breeding

- "artificial" selection

- dogs → Canis domesticus

→ Canis lupus

- non-aggression

- cuteness

- smarts / stupids

- short hair / long hair

- tomato → colour

→ regularity

→ resistance to disease

→ taste

③ Homology

↳ closely related species share similar structures

eg. pentadactyl limbs in mammals

↳ used for different things

↳ same parts → but adapted.

eg. DNA is heavily conserved

primate 98%

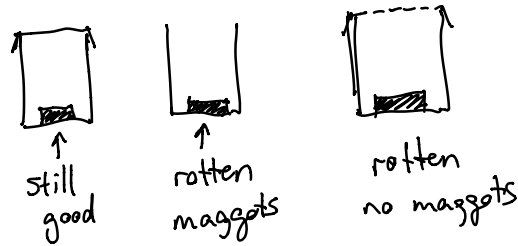
earthworm 70%

④ Vestigial organs / limbs / structures.

Abiogenesis (1.5?)

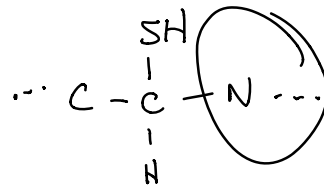
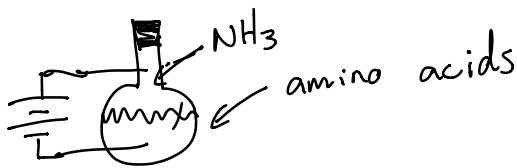
not life beginning

- Cell theory
→ all cells arise from pre-existing cells
- Pasteur



- Big problem → cells are massively complex

Miller - Urey expt's



Proteins

50 → 100

Carbohydrates

0

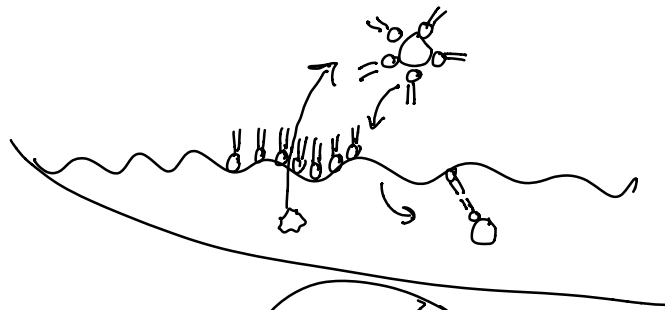
Phospho
Lipids

1

(DNA)
RNA

DNA ↔ proteins

- ① mRNA-only World
- ② Panspermia → life seeded from outer space.
- ③ Sydney Fox → 1990 → oil slick hypothesis



← hydrophilic
← hydrophobic

1B →

SELECTIVE
PRESSURE

- ① overproduction of offspring
- ② competition for limited resources
- ③ differential survival & reproduction