9/29/94

GENETICS (gene) — make mutants, look at phenotype
mol. bio
proteins ↔ biochem. ↔ function
- purify prots, study function

Its going to be impossible for biologists to survive w/o doing all three.

Example of when this doesn't work
A) ① yeast makes chitin
② purified chitin synthetase
③ mutant still made right chitin
④ 4th cs purified was right one

Get papers in Cell by biochemists & cell biologists about genetics that are totally messed up.

Genetics-History (words) - words are a problem - esp. for non-biologists

Position - location of a gene/mutation (where in the DNA) vs. Function - what it does (consequence of difference)

output program

Phenotype - what you can see, observe, measure
Genotype - what is written in the genes
Inherited trait - one in which the phenotype can be predicted from genotype

- just because there is a lump doesn't mean there is a gene for a lump
- just because there is a genotype does not mean there is a phenotype e.g. PKU

- no such thing as a Dominant mutation - Dominance is function.

Mutations - changes in genotype

Defined by experiment w/ heterozygotes:
Dominance - phenotype of heterozy. resembles one parent
Recessiveness - phenotype of non dominant parent

e.g. Sickle cell anemia
① mutation = glu → val
② phenotypes
- anemia = RECESSIVE
- malaria resistance = DOMINANT
- electrophoresis = CO-DOMINANT
- cell sickling = INCOMPLETE DOMINANCE
- DNA sequence = CO-DOMINANT

Co-Dominance: heterozyg. has phenotype of both parents
e.g. ABO
Partial / Incomplete dominance - heterozygote resemble neither parent
e.g. R x W = PINK
e.g. ABO
A dominant to O
B dominant to O
A & B co-dominant

Baseball vs. Genetics -- fundamentals are the key

POSITION

Distance

FUNCTION

Allelism

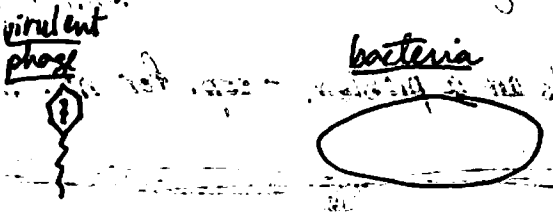
Allele - something involved in the same functional unit/gene

Complementation

EXAMPLE

- Phage (genes w/ protein coat)

haploid



MAPPING TS MUTATIONS

@measure recombination (high MOI) = look at F2

TS1	TS2	TS3

10ML x 10ML

↓

1 cycle @ permissive

↓

titer 37

titer 25

$$\text{frac} = \frac{\#\text{recomb gametes}}{\#\text{total}} = \frac{2 \times (\#\text{wt})}{\text{total}}$$

Dominance - look at F1

mix M1 + wt → infect at high T° → assay at low T°

2x M1 →

2x wt →

92 or 45

<5

100