

Cytoplasmic Heredity

1) Criteria

Mend. rates, links, rapid fixation
 Cyt. - no... - recip x's, disease

cell lineages

2) Cytoplasmic inheritance

no x-same diff in cells; no controlled mutation
 (laurel & green moss r. H. in corn)

3) Overwhelming Mendel. in heredity.

- a) *N. tabacum* x *glauca* - all cyphotic recovered from tobacco cytoplasm = species diff
 - b) Plant breeders
 - c) *Peromyscus* subspecies crosses
 - d) Grass x corn
 - e) x 2 species corn-like plants got pure *zebra* from *zebra* seed.
- All show differentiation of nucleus ↑ in species crosses.

4) Some cytoplasmic cases, however.

In general degree of transmission diff correlated with degree of cytoplasmic heredity.

Usually general compatibility effect (disharmony) (exception = plants)

- closer more neutral
- farther more incompatible (when not neutral usually die).

protein specificity = none

species cyto

- a) *O. hookeri* x *O. Remykiana* - R perpetuated never adjusted to H. cyt.
- b) M + m varieties of beans in factor lethal in cytoplasm. fruit & length
- c) *Lactuca* x *virginica* ♂ sterile for 10 generat. s
- d) *Brassica* reciprocal cross

race species genera

- ↑ after - racial = alike
- " - species = diff
- " - generic = more diff

individ. variant (usually plastid effects)

indiv. diff

- a) Corn recip crosses - chlorophyll char carry down & line (same cases)
 73 out of 76 = Mendel. in one case = fair for where most cytoplasm
- b) pollen sterility in corn thru male

5) Cases 1st of cytoplasmic = early gene or maternal influence show down to carry thru F₂

Oocyte affinity:

- a) silkworm - Voltinism + yolk color, ~~same color~~
- b) gammarus larvae body color
- c) *Drosoph.* gene in 2nd chrom some fert'd by XX = lethal
- d) *Drosoph.*

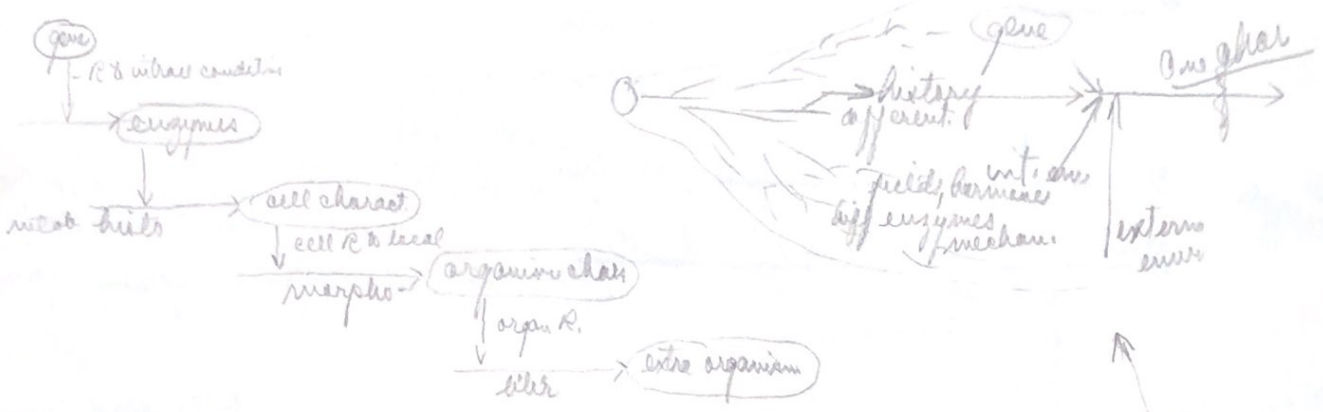
early stages

maternal influence

- a) Dark ephebia offspring after AA testis transplant
- b) silk worm, silkworm caterpillar
- c) *Cebus* & *anthracis* maybe
- d) Mammary cancer in mice
- e) *Satura nifus* disease

chromosomes & cytoplasm

Relations Genes and Adult Characters



Direct: protein specij, duplicatiⁿ (specificities) antigen = part/duplicate
indirect: enzyme - pigmentation roles of metabolism
 a) white-black rabbits silk worm juices
 b) rose & lavender beetle
 c) n⁺ cut⁺ substances metabolites

Remained: morphological characters
 1) General - rabbit size (merula stage)
 2) Local - neural crest - defective mix (100000)
 3) Gen-loc - dwarf mice
 4) Rec-gen - polydactyl.

Such patterns depend on complicated series of R's - don't think of "in genes".
All genes on all char.s

Factor interaction
 a) Coat color, eye color, Dahlia color, hweet pea
 threshold
 1) co-pigm.
 2) calupet.
 3) O₂-reduct.

Phenoghar
 a) Arthropodia
 b) Hymenoptera c) Drosophila eye color
 d) pigments & scales for wing pattern
Here are gene mutation. St.

On other hand cell characters
Flower color Dahlia tetraploids - gene diff't dosages A results
in graded increase in purplish hue

Quantitative & qual. diff'ces
Case YY YY YY YY give graded increase in amount of sub A.
 = comparable homologous R's.

Genes & morphology constraints
 Complex patterns to simple quant. prodn.
 g. bits constraints.

Early on date

Quarterly 1934

✓ 1. Criteria Cyt vs Mendel. hered.

Relative imp. cyto & Mendel. at each of 119 levels. illust. w. reflex

hand copied by
cyto in Mendel = diff. thing

- a. early stages devel.
- b. racial, specific, & generic differ
- c. quantit. variab. w/in races
- d. protein specificity
- e. differ to cell lineages w/in organism

1 = a
2 = b
3 = taxonomic
4 = c
5 = d

✓ 2. Possible relative gene & char. cyt ex. s in each case. direct & indirect.

- 1) color of alb. rabbit
- 2) down with spot vs color rabbit
- 3) dextral vs sinistral ear vs. lymphoma
- 4) blood type in humans

Small
5) normal dwarfism
6) + vs - w/h. & h/w in mice
7) plumage ♂ & ♀ breed by h/w

✓ 3. Usual rule w. respect Domin. in mult. allel. series? physiol. explan.?

illus. s vs Physiol. basis plain dominance

✓ 4. Pale hered. & environ. in morphology. how come diff. forms dev. in same sea? to what extent gene control? min. demand for log. how much make actually? No?

5. Galton's theory of sex determin. & intersex type of expt. used?

his explan. feathered ♂ & plain ♀ antennae (intersex type?)

✓ 6. predom. matern. char. hybrids of early stages cited as evid. major differ betw org. s = cyto. indiv. differ = nuclear. discuss validity of argument.

what does direct genet. evid. indic. of absol. & relat. freq. s of nuclear & non-nuclear differ between indiv. of same stock? & between species?

prob. genet. basis of irreversible differ. of cells? = cytoplasmic) few mutations

⑦ what mean by part. effect in genetics? 2 ex. s what are its implic. s w. respect to nature & action of genes?

⑧ what results typical for all possible host-donor comb. s in transplants involving 2 inbred strains & 1st cross.

for F₂ when 9 accept & 7 reject grafts from one of strains?

what does it imply? further that all F₂'s accept grafts from other strain?

what are implications for gene action of data on heredity of specificity?

9. at least 4 signifi. diff. relat. s between genotype & phenotype
in actual multiple allelic series & interpret from standpoint
of physiol. of gene action. ^{the "morphs"}
white series

10. simple possible physiol. interpret. of each of the 4 ratios
assuming dominance = complete & order = that of decreasing
grade of character. Represent in diag.
9:3:4
9:7
15:1

11. Prob. nature prim. gene action? ^{"haplous"} ^{thing as R's}
evid. from various sorts of char. diff. known to be hered. ^{argymer}

12. Physiol. interpret. w. concrete illust. s + diag. s & graphs
of dominance
of factor interaction
effects of combinations of mult. alleles

- 2/ Cytoplasmic Inheritance
- 2/ Relation - Gene & Charact.
- 3/ Dominance & Alleles