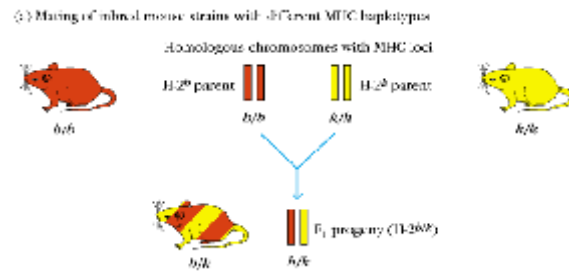


1. Define co-dominance:
Full expression in the heterozygous state. + 2 points
2. Define polygenecity:
“possessing any of a **group of nonallelic** genes that collectively control the inheritance of a **quantitative character** or modify the expression of a quantitative character...” + 3 points
3. Define linkage *disequilibrium*:
When the observed frequencies of haplotypes in a population does not agree with haplotype frequencies predicted by multiplying together the frequency of individual genetic markers in each haplotype. + 4 points
4. Define polymorphism:
“presence of multiple **alleles** at a locus”
n [ISV] (1839) : the quality or state of being able to assume different forms:
as **a** : existence of a species in several forms + 5 points
And by extension: existence of a gene in several forms
5. Define haplotype:
“the set of **alleles** of linked genes present on one parental chromosome...” + 5 points
6. Define CRM:
CRM = cross reacting material + 2 points
A single epitope occurs on multiple antigens; this common epitope reacts with TCR's and Ab's; thus an immunological response stimulated by one immunogen will produce a response to heterologous antigens that share the common epitope
7. Define agglutination.
“The aggregation or clumping of **particles**.” + 2 points
8. Describe an ELISA reaction: + 6 points
ELISA = Enzyme-Linked Immunosorbent Assay

Antigen is introduced into a plastic well; Ag's are most commonly proteins and proteins adhere to plastic surfaces. Hence there is a layer of antigen. A source which may have Ab of a specific isotype is introduced. If the Ab is present it associates with Ag. The well is washed to remove excess Ab. Next an Ab to the Fc portion of an Ab isotype is introduced. This second Ab has an enzyme coupled to it. If the first Ab bound to Ag, the second Ab will bind to the Fc region of the first Ab. Non-bound Ab is washed out. The enzyme linked to the second Ab catalyzes a chromogenic reaction. Introduction of substrate will produce a colored product. The presence of this colored product reports the presence of the first Ab.

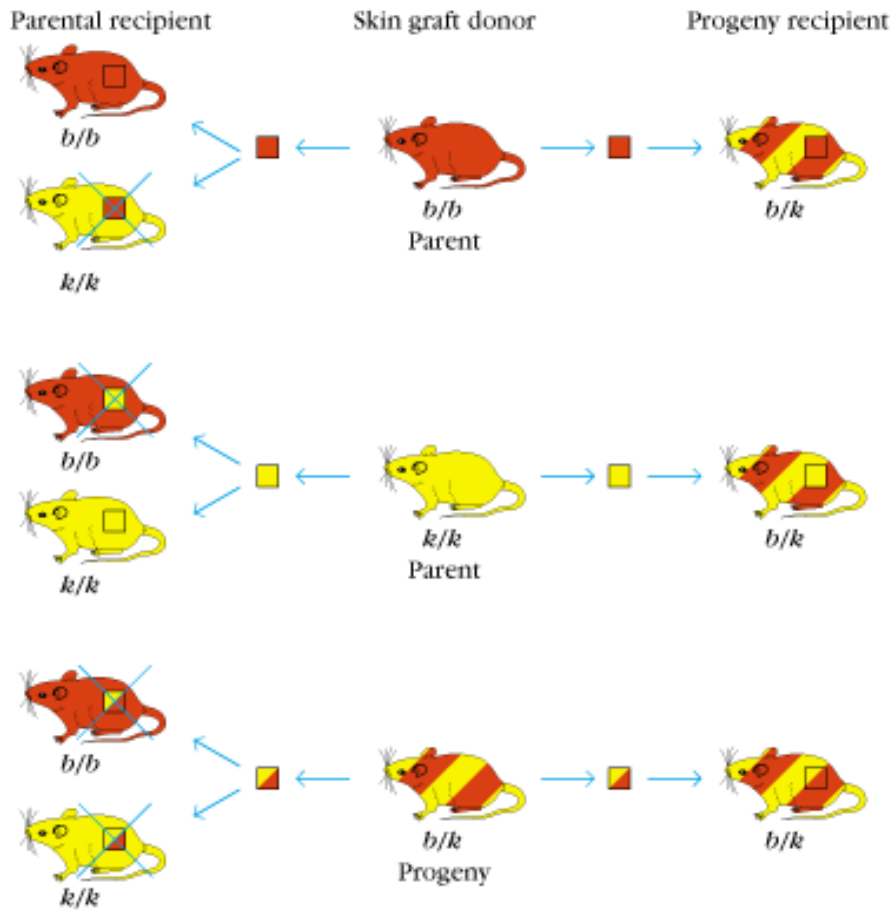
PART II

Consider the cross depicted below:



Now consider the various skin grafts depicted below. The mice in the center of the image are donors. Those on the left and right are recipients. Four recipients on the left reject transplants. All on the right are successful. At the points where there are horizontal lines, explain why transplants are unsuccessful or successful. (Use space judiciously.)

(b) Skin transplantation between inbred mouse strains with same or different MHC haplotypes



k/k sees "b" haplotype as **not self**

b/k sees "b" haplotype as **self**

b/b sees "k" haplotype as **not self**

b/k sees "k" haplotype as **self**

b/b sees "k" haplotype as **not self**

b/k sees both "b" & "k" haplotypes as **self**

k/k sees "b" haplotype as **not self**

+3 points for each correct answer