Exercise in forward genetics part II

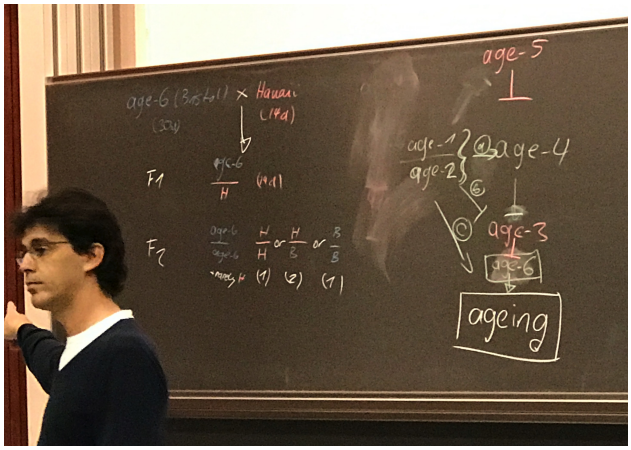
You want to identify the gene mutated in the *age-6* mutation identified in your synthetic screen from part I. For this purpose, you cross the *age-1* mutant to the polymorphic Hawaii mapping strain.

(a) Write the crossing scheme you use to map *the age-6* mutation. How do identify the recombinants for genotyping?

First, you need to map the mutation to one of the six chromosomes. For this purpose, you use one marker on each chromosome. These are the results:

Table 1-1

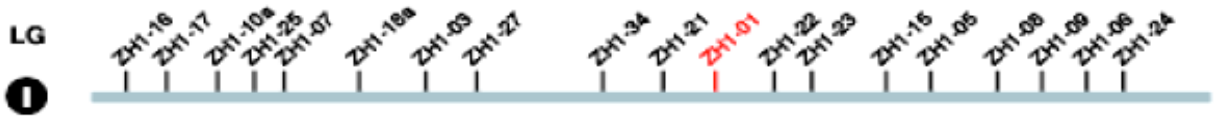
marker:	chr 1	chr 2	chr 3	chr 4	chr 5	chr X
1	Bristol	Bristol	Bristol	Hawaii	Hawaii	Bristol
	Bristol	Hawaii	Hawaii	Hawaii	Hawaii	Hawaii
2	Bristol	Bristol	Bristol	Hawaii	Bristol	Bristol
	Hawaii	Hawaii	Hawaii	Hawaii	Hawaii	Hawaii
3	Bristol	Hawaii	Hawaii	Bristol	Bristol	Hawaii
	Bristol	Hawaii	Bristol	Bristol	Bristol	Bristol
4	Bristol	Bristol	Bristol	Bristol	Bristol	Hawaii
	Bristol	Bristol	Bristol	Hawaii	Hawaii	Bristol
5	Bristol	Hawaii	Hawaii	Hawaii	Hawaii	Bristol
	Bristol	Bristol	Bristol	Bristol	Bristol	Hawaii
6	Bristol	Bristol	Bristol	Hawaii	Bristol	Bristol
	Bristol	Hawaii	Hawaii	Hawaii	Bristol	Hawaii
7	Bristol	Hawaii	Bristol	Bristol	Hawaii	Hawaii
	Hawaii	Hawaii	Bristol	Bristol	Bristol	Hawaii
8	Bristol	Bristol	Bristol	Hawaii	Bristol	Bristol
	Bristol	Bristol	Hawaii	Bristol	Hawaii	Hawaii
9	Hawaii	Hawaii	Hawaii	Bristol	Bristol	Bristol
	Bristol	Bristol	Hawaii	Hawaii	Hawaii	Hawaii
10	Bristol	Hawaii	Bristol	Hawaii	Bristol	Hawaii
	Bristol	Bristol	Bristol	Hawaii	Hawaii	Bristol
11	Hawaii	Hawaii	Hawaii	Hawaii	Bristol	Hawaii
	Bristol	Bristol	Bristol	Bristol	Hawaii	Bristol
12	Hawaii	Bristol	Hawaii	Hawaii	Hawaii	Bristol
	Hawaii	Hawaii	Bristol	Bristol	Bristol	Hawaii



Linkage to the marker we used is not very strong, it is linked, but not very closely linked to the age-6 mutation.
Marker on age-1 is very strongly linked to age-6

(b) Why are two genotypes for each recombinant shown in Table 1-1?

(c)On which chromosome is the *age-6* mutation most likely located?



4 possible Marker

All recombinant are long lived

Table 1

marker:	ZH1-17	ZH-18a	ZH-22	ZH-09
1	Bristol	Bristol	Bristol	Hawaii
	Bristol	Bristol	Bristol	Bristol
2	Hawaii	Hawaii	Bristol	Bristol
	Bristol	Bristol	Bristol	Hawaii
3	Hawaii	Bristol	Bristol	Bristol
	Bristol	Bristol	Bristol	Hawaii
4	Bristol	Bristol	Bristol	Bristol
	Hawaii	Hawaii	Bristol	Bristol
5	Hawaii	Hawaii	Hawaii	Bristol
	Bristol	Bristol	Bristol	Bristol
6	Hawaii	Bristol	Bristol	Bristol
	Bristol	Bristol	Bristol	Hawaii
7	Bristol	Bristol	Bristol	Bristol
	Hawaii	Hawaii	Bristol	Bristol
8	Hawaii	Hawaii	Hawaii	Bristol
	Bristol	Bristol	Bristol	Bristol
9	Bristol	Bristol	Bristol	Hawaii
	Bristol	Hawaii	Bristol	Bristol
10	Bristol	Bristol	Bristol	Bristol
	Hawaii	Hawaii	Bristol	Bristol
11	Bristol	Bristol	Bristol	Hawaii
	Hawaii	Bristol	Bristol	Hawaii
12	Hawaii	Bristol	Bristol	Bristol
	Hawaii	Hawaii	Bristol	Bristol

(d) Next, you use 4 markers on the chromosome you think *age-6* is located to determine the chromosomal sub region. Below you see the distribution of the markers on the chromosome and the results of the genotyping. Which marker is closest to the *age-6* mutation? How can you increase the mapping resolution?