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Genetics problem set

Two color loci effect is not linked to the mouse. CC or CC mice are agouti. Mice with cc genotype are altogether because all pigment production and pigment deposition in hair is blocked. In second place, The Allele B (Black Agouti Coat) is dominant on Allele b (brown agouti coat). The mouse is paired with a black agouti coat with an albinismouse from BBC Globe. Half of the offspring are alveage, a quarter of them are black Agoti, and a quarter are brown aguti. What is the genotype of Agoti's black father? A. BBCC B. BbCc This is the only possibility of this combination of offspring. C. BBCC D. BbCC E. BBcc University Biology Project in Arizona September 9, 1998 Contact the Development Team all copyright contents © 1996. All rights reserved. The dual non-heterogeneous gene a/a and B/B are tested across to the double recessive mother. The following distribution of the phenotype among the offspring is observed: A-B-85 A-bb 20 aaB-22 aabb 73 total 200 Is the gene associated (use chi square independence test)? If so, what is the map distance between them? The following data are from Bridges and Morgan's early work on re-conducting the fruit flies. They studied five genes on chromosome 2: black, curved, purple, corn, and vestigial. Code mutant virtual virtual style b black body gray body c wings curved straight wings pr red eyes sp specks on wings no spots vg vestigial long wings here their results. Each row shows the combined result of the numerous crosses involving this pair of genes. Total gene pair files number of recombinant B, c 62,679 14,237 b, PR 48,931 3,026 b, sp 685 326 b, vg 20,153 3,578 c, PR 51,136 10,205 c, sp 10,042 3,037 c, vg 1720 141 sp, vg 2,054 738 sp, pr 11,985 5,474 pr vg 13,601 1,609 per pair of loci, what is a small portion of recombinant offspring? Collect data from those crosses to produce a map of chromosome 2 showing the relative locations of these genes to the nearest cM. (Remember that short map distances are more reliable than long map distances.) (Adapted from Russell, Genetics) Hint: They've done most of the work for you. All you have to do is translate a number of recombinant into a map distance between each pair of genes, then arrange all five genes in one map of the chromosome. Instructions: The following problems have multiple-choice answers. The correct answers are enhanced with a brief explanation. Incorrect answers are linked to lessons to help solve the problem. University of Arizona Revised Biology Project: November 5, 1998 Contact the Development Team All Copyright Contents © 1996-1998. All rights reserved. CREDITS 1. This is a case of incomplete dominance that is shown by both the 1:2:1 ratio and the presence of an intermediate virtual pattern that is displayed in either parent. B = black bw = black and black sprayed black chicken is homozygous for allele black color (B B) and Blue chicken is heterozygous (Bw). In the cross of these two birds expect to see a 1:1 share of black and blue slate birds, B BW BBBBlack BBwSlate Blue BBBBlack BBwSlate Blue 2a. Four virtual patterns are observed in f2 offspring and a share of 860:320:330:90 is very close to 9:3:3:1 which means that this is the Cross deheep. Both parents are hitorozigos for 2 different genes with dominant black to the dominant green and yellow spots on the red spots. B = black; b = green; Y = yellow spots; y = red spots b. PBByyXbbYY F1BbYy F2B-Y-9: Black with yellow spots; B-yy3: Black with red spots; bbY-3: Green with yellow spots; bbyy1green with red spots: this is just one option to label alleles; Any message system is fine as long as it shows the structure of dominance. C. Black body with yellow spots = BBYY, BBYy, BbYy, bbyy black body with red spots = BByy and baby green body with yellow spots = bbYy and bbYy green body with red spots = bbyy 3. If the dog is a pure breed it will be homozygous for both dark qualities (DD) and short hair (SS). Here are some examples of crosses that can be performed to test this: (dark = DD and DD, already honed = DD, short hair = SS and SS, long hair = ss) a. cross test: the dog is crossed in question with the dog who is already alton and long hair so homozygous recessive in all of all alleles (ddss). If the offspring are all dark and short-haired, then you can assume that the dog is homozygous in each gene. If the offspring contain any long hair or albino dogs then the dog being tested is heterozygous in this gene: 1/2 long dark, 1/2 short dark = DDSs 1/2 short dark, 1/2 short alvev = DdSS 1/4 long dark, short dark, 1/4 long alvear, 1/4 short alvear = DdSs all short dark = DDSS this cross will require more offspring to be examined in order to determine the proportions. There are many opportunities for obtaining prevailing virtual patterns that are non-formative. 4. One explanation is that there are 3 genes that determine the composition of the century and a dominant allele of every century is needed. Homozygous recessive in 1 or 2 or all 3 genes will give a phenotype (37/64). All others who have at least one of the dominant century alleles in each of the 3 genes will have a century (27/64). 3/4 A-x3/4 B-x3/4 C-27/64 A-B-C-3/4 A-x1/4 bb x1/4 C = 9/64 A-bb-bbc-1 3/4 A-x1/4 bb x1/4 cc = 3/64 A-bbcc 3/4 A-x3/4 B-x1/4 cc The government's commitment to the united nations is a good way to address the challenges of the future. 1/4 aa x1/4bb x1/4 cc = 1/64 aabccc 37/64 5. Alleles: H = Good Student, h = Poor Student, E = On time for tests, e = late tests a) Hh X Hh - 3 good student (HH & amp; amp; Hh): 1 poor student (hh b) HhEe x HhEe-9 Good Students (H-E-); 3 poor students (H-E-); 3 does not appear (H-ee); 1 does not show (thee) students who have delayed tests failed because late for genetic tests (EE) phenotype masks THP (H-h- or hh). This gives us the adjusted ratio of 9 good students: 3 poor students: 4 does not appear. In terms of testing This is 9 success tests: 7 failed tests. 6. III-1III-2 (2/3x1/2) (2/3x1/2)1/4 = 4/144 = 1/36 P = unaffected, p = phenylketonuria in the second generation there is an affected individual telling us that the parents (I generation) are both heterozygous (Pp). The unaffected offspring that mating each have a 2/3 chance of carrying the recessive (p) allele. There is a 1/2 chance that the second -2 and 2-4 will pass on (p) allele if they carry them. Finally, if each of these heterozygous individuals have a 1/4 chance to pass on both the recessive alleles (r) to the fourth generation. Because all these things have to happen in order to get the disease transmitted, individual probabilities must be multiplied. Back to home page

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