1. Which of your genotypes would you be able to better determine if you considered the phenotypes of your parents and siblings?

I would be better able to determine if I was homozygous dominant or heterozygous for the traits which I exhibited the dominant phenotype for.

1. Why don’t recessive traits always eventually disappear from populations?

Natural selection only impacts the phenotype of organisms.

1. What fraction of recessive alleles are “hidden” in heterozygotes for each of the eight single-gene traits that you studied?

|  |  |  |  |
| --- | --- | --- | --- |
| Characteristic | 2pq | q2 | fraction |
| Tongue Rolling | 0.49191918 | 0.19047619 | 430/763 |
| Widow's Peak | 0.36900075 | 0.57142857 | 72/295 |
| Thumb Crossing | 0.45216448 | 0.42857143 | 115/333 |
| Attached Ear Lobes | 0.49191918 | 0.19047619 | 430/763 |
| Dimpled Chin | 0.26173708 | 0.71428571 | 131/846 |
| Mid-digital Hair | 0.45216448 | 0.42857143 | 115/333 |
| Lactose Tolerance | 0.49191918 | 0.19047619 | 430/763 |
| "Asparagus Urine" Smelling | 0.1804232 | 0.80952381 | 38/379 |

1. How much would the frequency of the recessive gene for the inability to taste PTC be reduced if a tyrant eliminated all those who could not taste PTC from three successive generations before they could pass on their recessive alleles?

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| p2 | p2 equation | 2pq | 2pq equation | q2 | q2 equation | p frequency before murder | p frequency before murder equation | q frequency before murder | q frequency before murder equation |
| 5.51 | =G2^2\*21 | 10.49 | =2\*G2\*I2\*21 | 5 |  | 0.51 | =1-I2 | 0.49 | =SQRT(E2/21) |
| 16.08 | =G3^2\*21 | 4.59 | =2\*G3\*I3\*21 | 0.33 | =I3^2\*21 | 0.88 | =1-I3 | 0.12 | =C2/2/42 |
| 18.77 | =G4^2\*21 | 2.17 | =2\*G4\*I4\*21 | 0.06 | =I4^2\*21 | 0.95 | =1-I4 | 0.05 | =C3/2/42 |
| 19.93 | =G5^2\*21 | 1.06 | =2\*G5\*I5\*21 | 0.01 | =I5^2\*21 | 0.97 | =1-I5 | 0.03 | =C4/2/42 |
|  |  |  |  |  |  | 0.99 | =1-I6 | 0.01 | =C5/2/42 |

It changed from 0.12 to 0.01

1. Why might you expect the locus that governs lactose tolerance/intolerance to not be in Hardy-Weinberg equilibrium?

Lactose tolerance gives an evolutionary advantage.

1. What may have led to errors in your determining your total ridge count and how confident are you in the reliability of the heritability for this trait that you calculated?

Human error in counting. Not very confident because the population is not nearly as diverse as everyone in the world, it would only be reliable as the heritability of bio students in this lab.

1. IQ is another characteristic that is apparently heavily influenced by both genes and environment. What other human characteristics are likely to fall into this class?

Chance of developing heart disease and chance of developing certain types of cancer are other characteristics that are likely to fall into this class.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristic | GTA + Students with Dominant Phenotype | GTA + Students with Recessive Phenotypes | Frequency of Dominant Phenotype | Frequency of Recessive Phenotype |
| Tongue Rolling | 17 | 4 | 0.80952381 | 0.19047619 |
| Widow's Peak | 9 | 12 | 0.42857143 | 0.57142857 |
| Thumb Crossing | 12 | 9 | 0.57142857 | 0.42857143 |
| Attached Ear Lobes | 17 | 4 | 0.80952381 | 0.19047619 |
| Dimpled Chin | 6 | 15 | 0.28571429 | 0.71428571 |
| Mid-digital Hair | 12 | 9 | 0.57142857 | 0.42857143 |
| PTC-tasting | 16 | 5 | 0.76190476 | 0.23809524 |
| Lactose Tolerance | 17 | 4 | 0.80952381 | 0.19047619 |
| "Asparagus Urine" Smelling | 4 | 17 | 0.19047619 | 0.80952381 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristic | q | p | 2pq | p2 |
| Tongue Rolling | 0.43643578 | 0.56356422 | 0.49191918 | 0.31760463 |
| Widow's Peak | 0.75592895 | 0.24407105 | 0.36900075 | 0.05957068 |
| Thumb Crossing | 0.65465367 | 0.34534633 | 0.45216448 | 0.11926409 |
| Attached Ear Lobes | 0.43643578 | 0.56356422 | 0.49191918 | 0.31760463 |
| Dimpled Chin | 0.84515425 | 0.15484575 | 0.26173708 | 0.0239772 |
| Mid-digital Hair | 0.65465367 | 0.34534633 | 0.45216448 | 0.11926409 |
| PTC-tasting | 0.48795004 | 0.51204996 | 0.4997096 | 0.26219517 |
| Lactose Tolerance | 0.43643578 | 0.56356422 | 0.49191918 | 0.31760463 |
| "Asparagus Urine" Smelling | 0.89973541 | 0.10026459 | 0.1804232 | 0.01005299 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| VT | My VE | My VG | My heritability | AVG VE | AVG VG | AVG heritability |
| 587.181 | 2 | 585.181 | 0.9965939 | 50.225 | 536.956 | 0.91446419 |