**Advanced Gene Mapping Course: Pleiotropy Exercise Answers**

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1. Which of the SNPs have genome-wide significant (p<5x10-8) associations for both phenotypes within a dataset?

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| --- | --- | --- | --- | --- | --- |
|  |  | Phenotype 1 | | Phenotype 2 | |
| Dataset | SNP | OR | P-value | OR | P-value |
| 1 | rs1008723 | 1.25 | 1.74E-61 | 1.26 | 1.02E-66 |
| 2 | rs4135320 | 1.23 | 1.38E-53 | 1.24 | 1.12E-51 |
| 2 | rs1441027 | 1.23 | 2.70E-52 | 1.09 | 3.24E-09 |

1. Did the multivariate analyses result in additional SNPs that had genome-wide significant cross phenotype associations? Which SNP(s)?

Yes, the multivariate analysis increased the significance of two SNPs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Univariate Results | | | |
|  |  |  | Phenotype 1 | | Phenotype 2 | |
| Dataset | SNP | Multivariate P | OR | P-value | OR | P-value |
| 1 | rs1342326 | 3.12E-10 | 1.07 | 1.42E-06 | 1.07 | 5.14E-06 |
| 2 | rs343927 | 3.39E-11 | 1.08 | 9.59E-09 | 1.08 | 3.06E-07 |

1. For each SNP analyzed in the mediation analysis, determine if there is evidence of biological or mediated pleiotropy. If mediated, is the mediation complete or incomplete?





Both rs1342326 and rs1008723 shows evidence of biological pleiotropy since neither the mediated effect estimate or the proportion mediated are significant.







All three SNPs (rs4135320, rs1441027 and rs343927) show evidence of mediation since the mediated effect and proportion mediated estimates are significant. Since in all three situations the estimated proportions are less than 1 and the 95% CI do not include 1 there is evidence that the mediation is incomplete. This means that there is some independent effect of the SNP on both phenotypes by some of the effect of the SNP on X2 acts through X1.