Genetics Day Poster Submission

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Title: DO PROTEINS WITH CORRELATED EVOLUTIONARY RATES HAVE SHARED FUNCTIONS?

Abstract: Proteins that coevolve with each other are expected to have shared biological functions. To test this idea, we examined over 12,000 mammalian proteins for their evolutionary rate correlations (ERCs). We used complete hierarchical clustering to group proteins based on coevolution, and then applied enrichment analysis to the resulting clusters. Initial work reveals different clusters with significant enrichment for functions in cell motility, DNA metabolism, mitochondrial activity, immune response, and lipid metabolism, supporting the idea that similarly evolving proteins share similar functions. Examination of ACE2 (the receptor for the SARS-coV-2 virus) reveals two novel protein partners, the cilia related protein SPAG17, and the plasma membrane adhesion protein ADGRG7. Results support the hypothesis that proteins which coevolve have shared functions and that ERCs detect potentially novel interactions between proteins relevant to biology and disease.