Previous work has been done on inferring the distribution of fitness effects (DFE), or the amount of deleterious, neutral, or adaptive mutations entering a population. Using genomic resequencing data from arctic wolf and breed dog data, there was no detectable difference in their inferred DFE. Here, we sought to determine if the current state-of-the-art methods for inference of the DFE had sufficient statistical power to detect a change in the DFE between canine populations. We performed forward population genetics simulations modelling canine evolution, and compared the inferred DFE and demographic parameters of simulated and empirical data. We have modeled ancestral wolf DFEs and demographic histories and are awaiting the results of our dog DFE simulations for comparison. Understanding if we can detect a difference in DFE will provide insight towards the impact of domestication on the DFE and help confirm the results found with reported empirical data.

**KIRK AND EDUARDO VERSION**

Previous work on inferring the distribution of fitness effects (DFE) [maybe explain here a bit what’s DFE] has shown that distantly related species have distinct DFEs. However, the timescales and conditions under which the DFE evolves remains unclear. Domestic dogs and wolves provide a system in which to understand how the DFE changes over recent timescales as the two populations split from each other fairly recently. Using genomic resequencing data from arctic wolf and breed dog data, there was no detectable difference in their inferred DFE. Here, we sought to determine if the current state of the art methods for inference of the DFE had sufficient statistical power to detect a change in the DFE between wolf and dog populations. We performed forward population genetics simulations modelling wolf and dog evolution, and compared the inferred DFE and demographic parameters of simulated and empirical data. We have modeled ancestral wolf DFEs and demographic histories and are still awaiting the results of our dog DFE simulations for comparison. Understanding if we can detect a difference in DFE will provide insight towards the impact of domestication on the DFE and help confirm the results found with reported empirical data.

Quantifying the Statistical Power in the Inference of the Evolution of the Distribution of Fitness Effects in Canine Lineages.

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Previous work on inferring the distribution of fitness effects (DFE) has shown that there exists a difference in DFE between diverged populations. However, using empirical arctic wolf and breed dog data, there was no detectable difference in their inferred DFE. Here, we sought to determine if the current state of the art methods contained the power to detect a change in the DFE between wolf and dog populations. We utilized a forward population genetic simulator to model wolf and dog evolution, and compared the inferred DFE and demographic parameters of simulated and empirical data. We have modeled ancestral wolf DFEs and demographic histories and are still awaiting the results of our dog DFE simulations for comparison. Understanding if we can detect a difference in DFE will provide insight towards the impact of domestication on the DFE and help confirm the results found with reported empirical data.

Previous work has been done on inferring the differences in the distribution of fitness effects (DFE) of new mutations between two diverged populations. When studied using empirical Arctic Wolf and breed dog data, it was shown that there was no change in DFE between these two populations. In this study, we sought to determine if the current state of the art methods contained the power to detect a change in the DFE amongst wolf and dog population. We utilized a forward population genetic simulator to model dog and wolf evolution. Simulated genomes were then put into Dadi and Fitdadi to infer both DFE and demographic parameters to be able to compare with the empirical data.

Quantifying the Statistical Power in the Inference of the Evolution of the Distribution of Fitness Effects in Canine Lineages

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The distribution of fitness effects (DFE), which describes the impact and effect of all new mutations in a population, is thought to play a fundamental role in shaping evolutionary trajectories and population demographic history. Previous work has shown that the DFE differs between highly divergent species, e.g., yeast, *Drosophila*, mice, and humans. However, between populations which have more recently diverged, such as dogs and arctic wolves, no significant difference in the DFE has been detected from empirical data. Here, we simulate different hypothesized scenarios of the evolutionary history of canine lineages and then test the statistical power of current methods to detectinfer how the DFE changes both between species and over time. We show that a sufficiently large change in DFE can be detected, and propose that such a change may not have occurred between domesticated dogs and arctic wolves. Next, we seek to develop a statistical framework to quantify the minimum detectable magnitude for shifts in the DFE.

Inferring the Distribution of Fitness Effects in Simulated Canine Lineages

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The distribution of fitness effects (DFE), which describes the impact and effect of all new mutations in a population, is thought to play a fundamental role in shaping evolutionary trajectories and population demographic historys. Previous work has shown that the DFE differs between highly divergent species, e.g., yeast, *Drosophila*, mice, and humans. However, between populations which have more recently diverged, such as dogs and arctic wolves, no significant difference in the DFE has been detected from empirical data. Here, we simulate different hypothesized scenarios of the evolutionary history of canine lineages and then test the statistical power of current methods to detectinfer how the DFE changes both between species and over time. We show that a sufficiently large change in DFE can be detected, and propose that such a change may not have occurred between domesticated dogs and arctic wolves. Next, we seek to develop a statistical framework to quantify the minimum detectable magnitude for shifts in the DFE.