

## EvolvingFront Project Status

Possible main point:

**Is there realized adaptive epistasis?**

-> Which mutations arise

-> How they navigate the trait space..

## Results

### 1. Evolution from several starting points, isolating adaptive mutations...

[essentially the experimental protocol]

### 2. Identity of isolated mutations is idiosyncratic

Some commentary about aspects of mutations/pathways...

We might have power to distinguish between IRA1-missense and IRA1-nonsense, especially...

Statistical absence of particular genes in IRA1-nonsense?

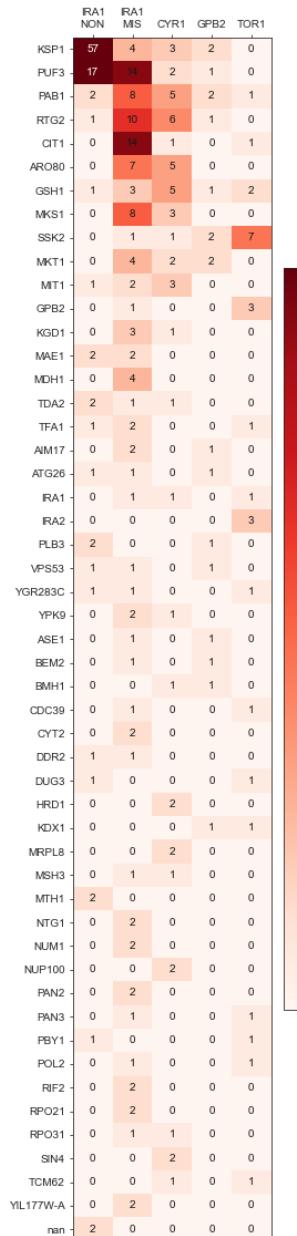
Can we put a limit on the size of selection coefficient?

why no CIT1, MKT1, etc. in IRA1-nonsense?

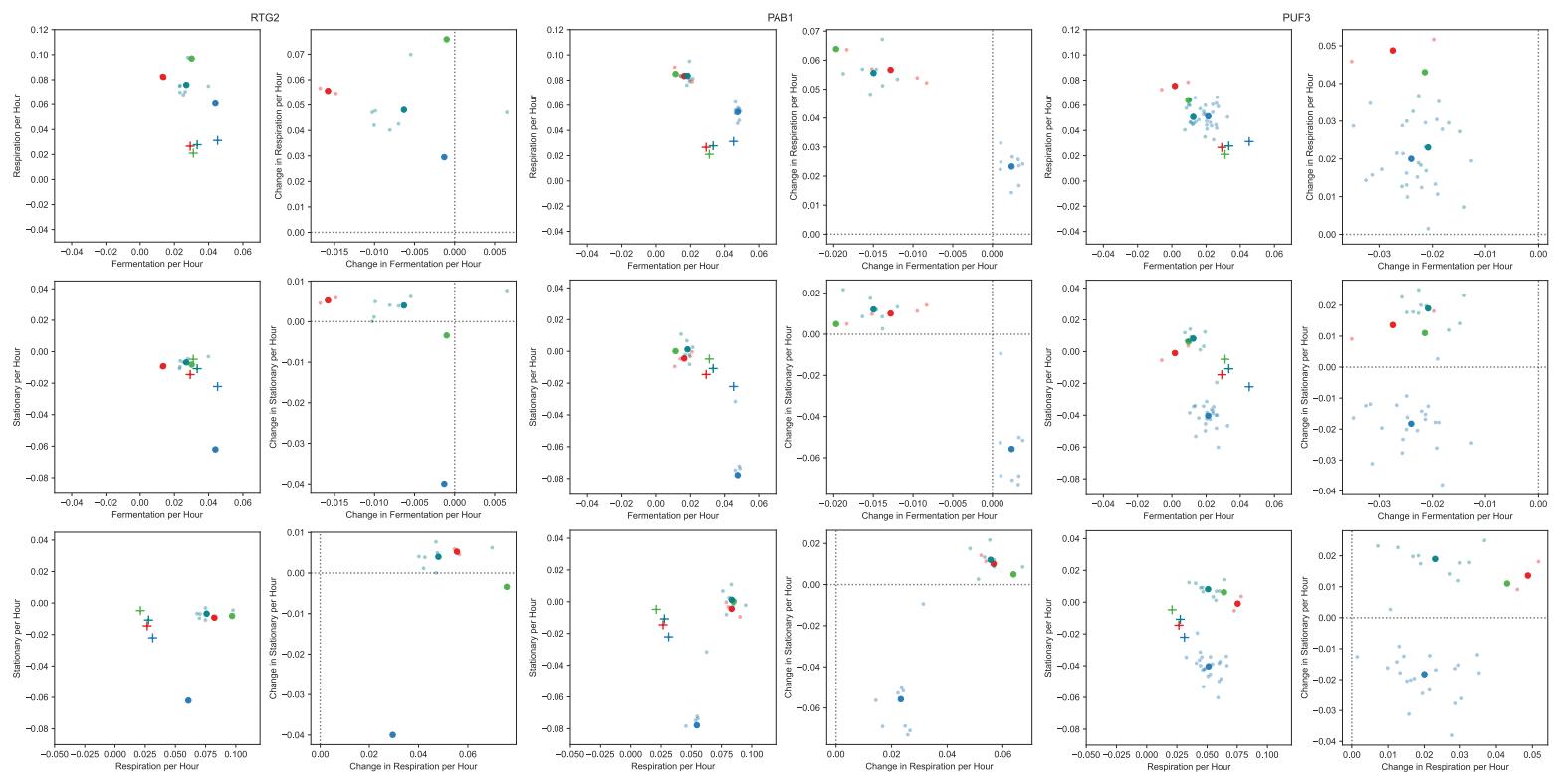
note: IRA1-mis with IRA1-non + MKT1 mutation...

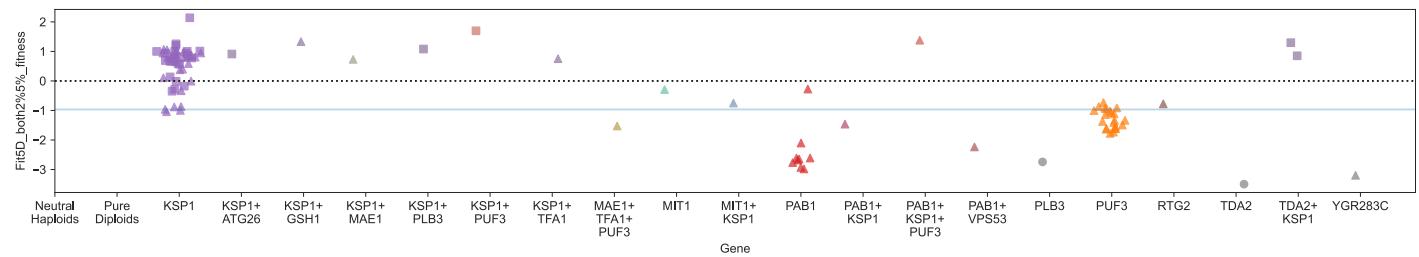
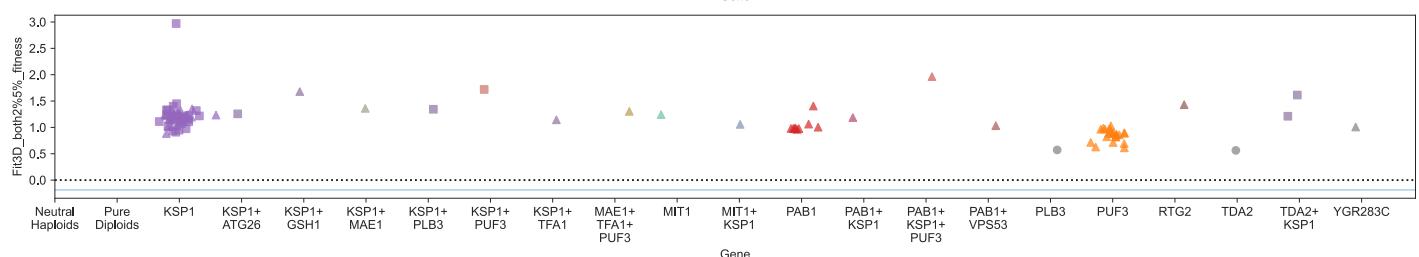
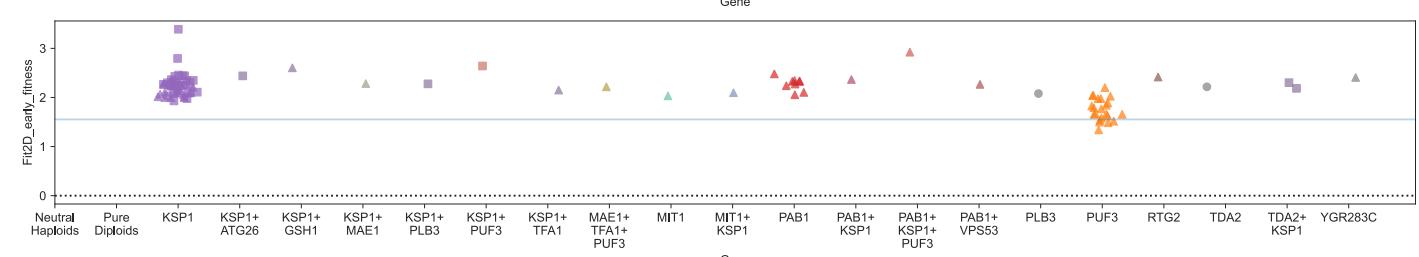
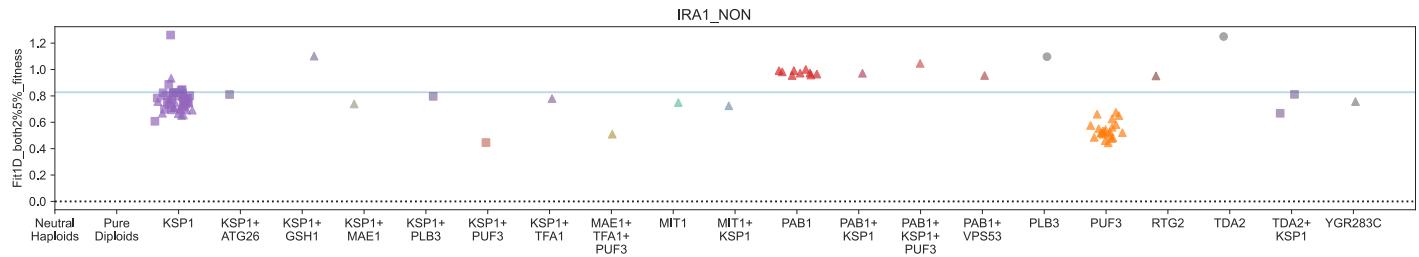
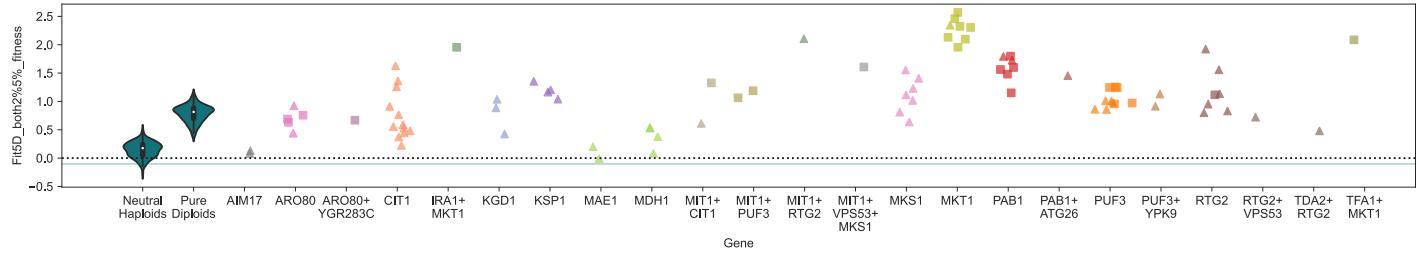
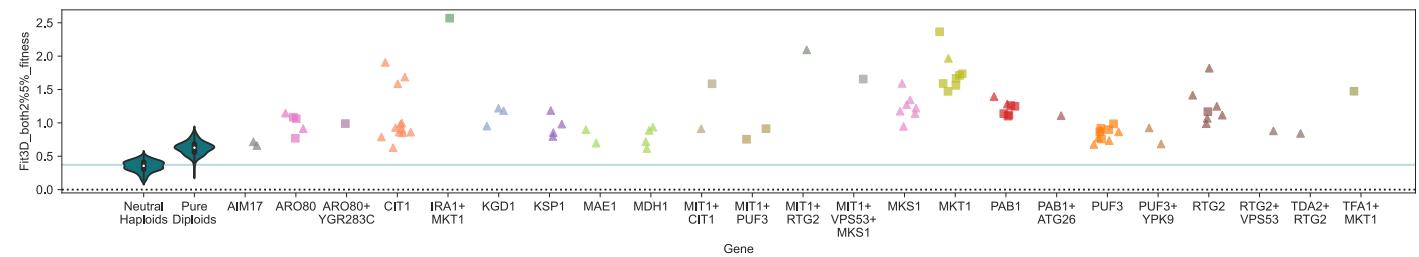
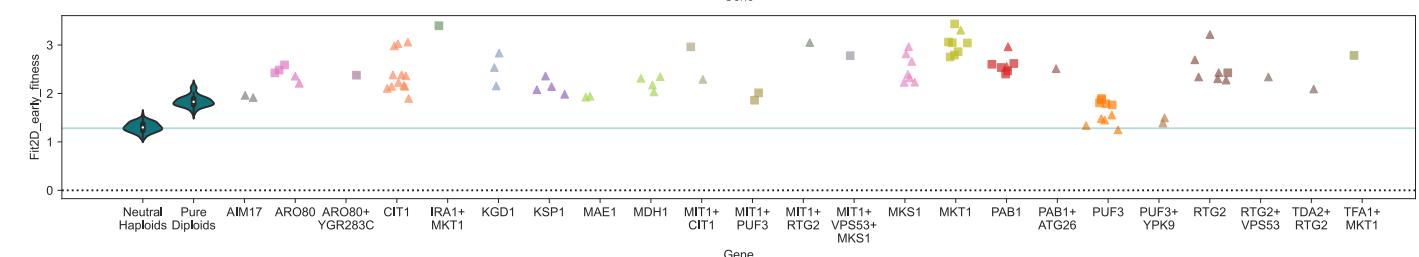
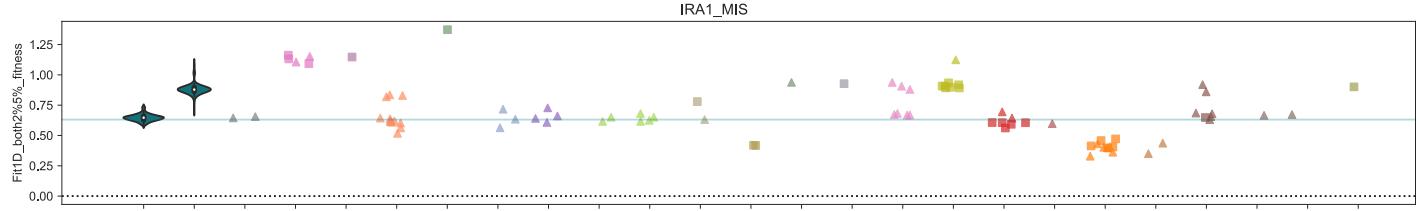
### 3. General description Fitness effects/performances of mutations??

More improvement in respiration vs fermentation in 2Day?



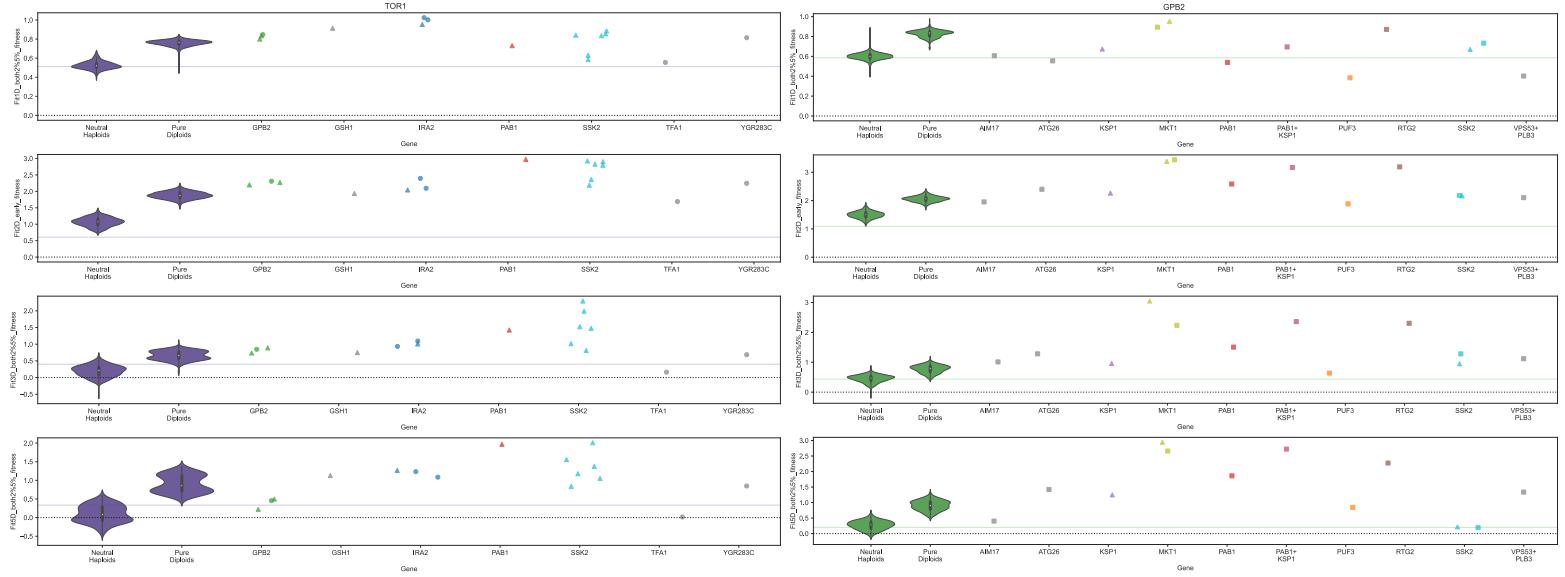
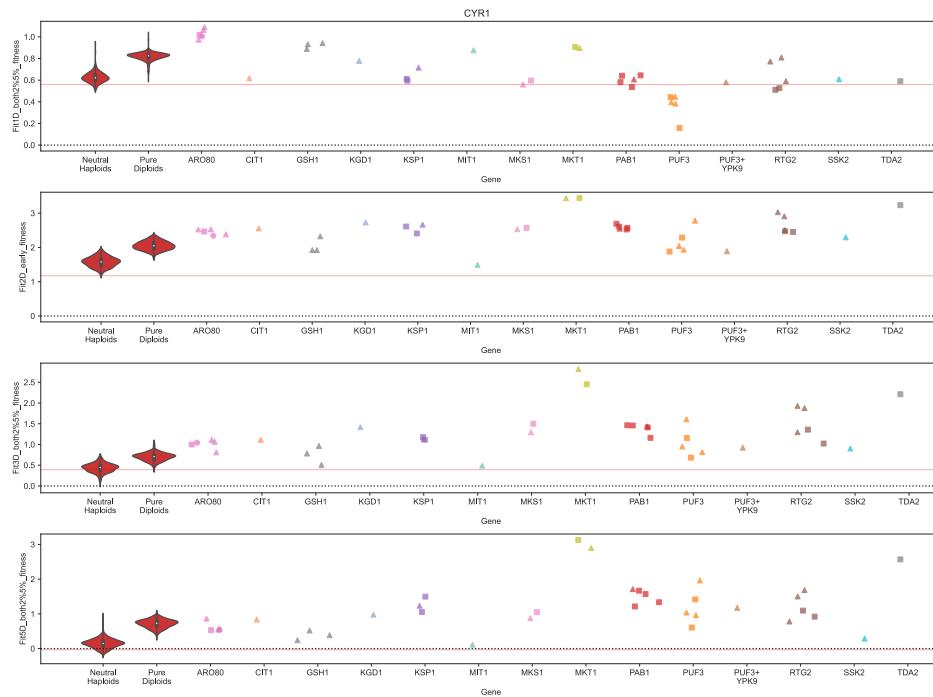
### 4. Cases of adaptive epistasis when mutation has different performances based on ancestral mutation





### 3. Fitness effects of mutations in each evolution condition?

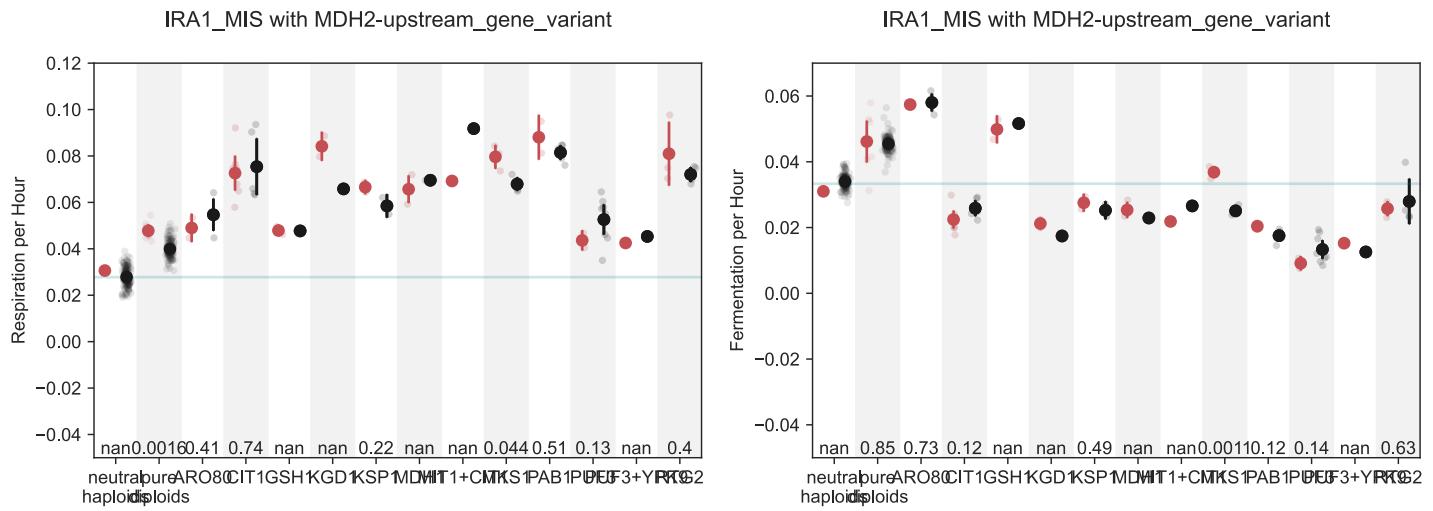
More CYR1 mutants isolated - why?



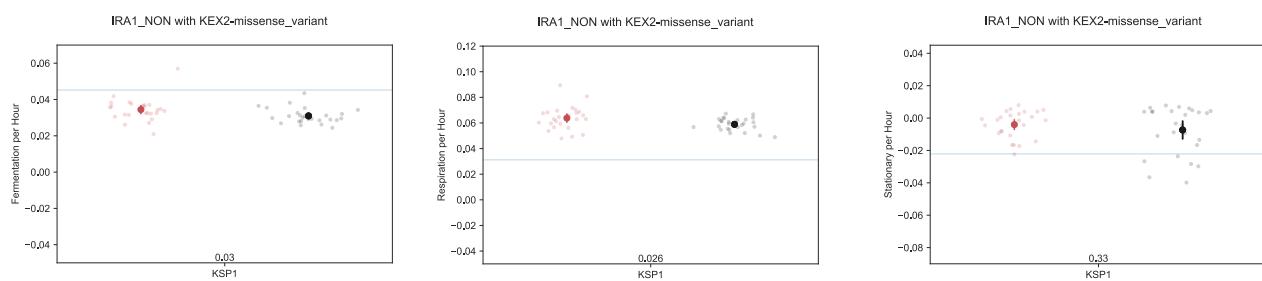
### 3.2 Caveat - background mutations....

Some of the mutants have pre-existing background mutations that may interfere with some interpretation.

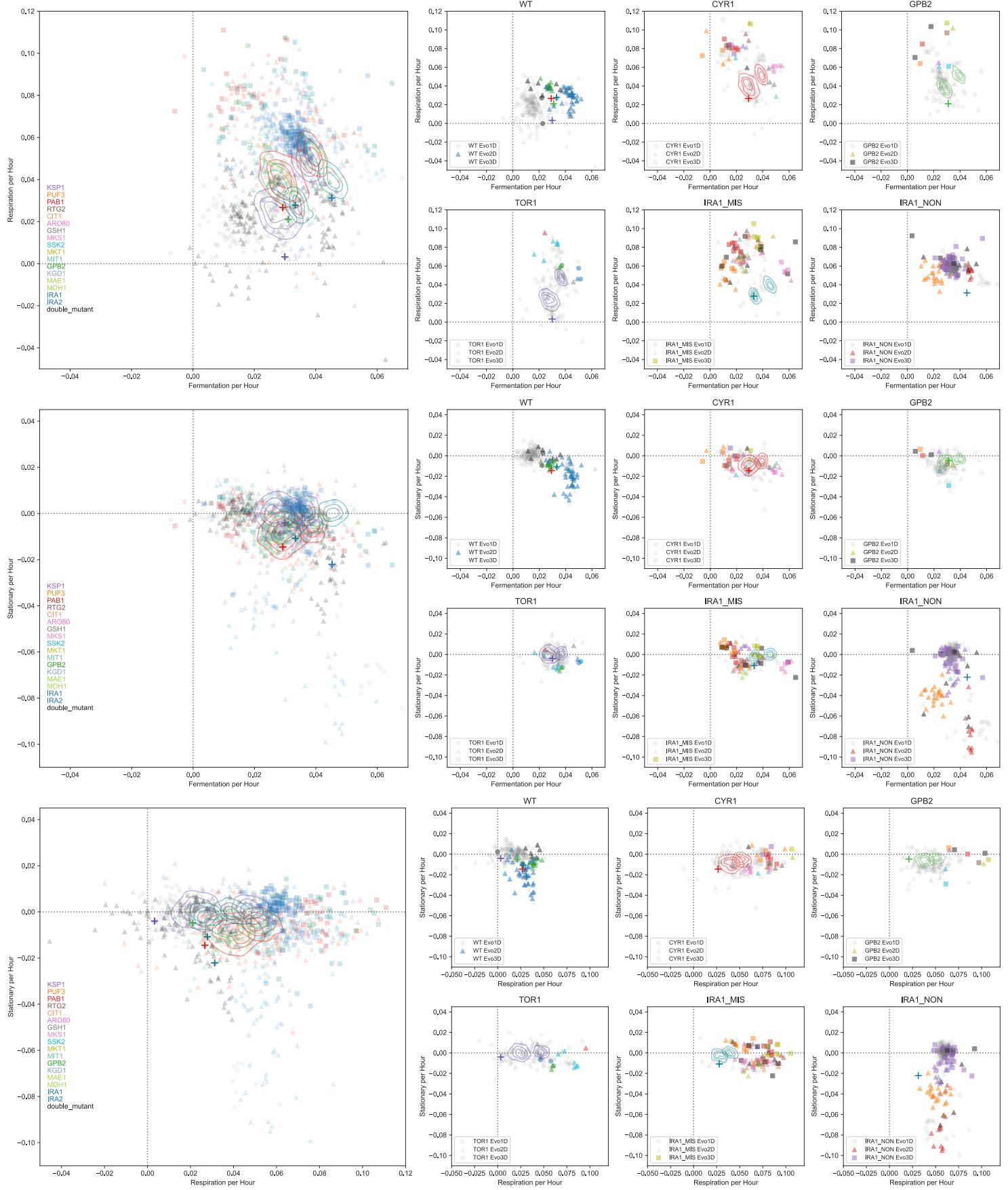
In particular, some 2Day IRA1-missense have an upstream variant in MDH2 that increases respiration and fermentation performance



Additionally, all 3Day IRA1-nonsense mutations have KEX2 missense + ATG1 missense background mutations and all 2Day IRA1-nonsense mutations have SPP2 missense mutations. These mutations result in difference in fermentation and respiration performance (but not stationary performance) for lineages carrying these background mutations. (red shows KEX2 + ATG1 variant, black shows SPP2 mutants, all KSP1 mutants shown).



#### 4. Directions in phenotype space/tradeoffs



## Do mutations go the same direction in phenotype space?

RTG2, PAB1, PUF3 all have decreased stationary performance for IRA1-nonsense.

