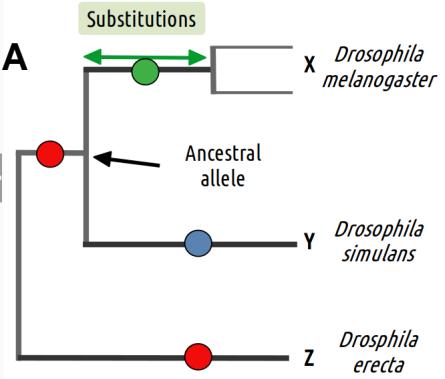


A

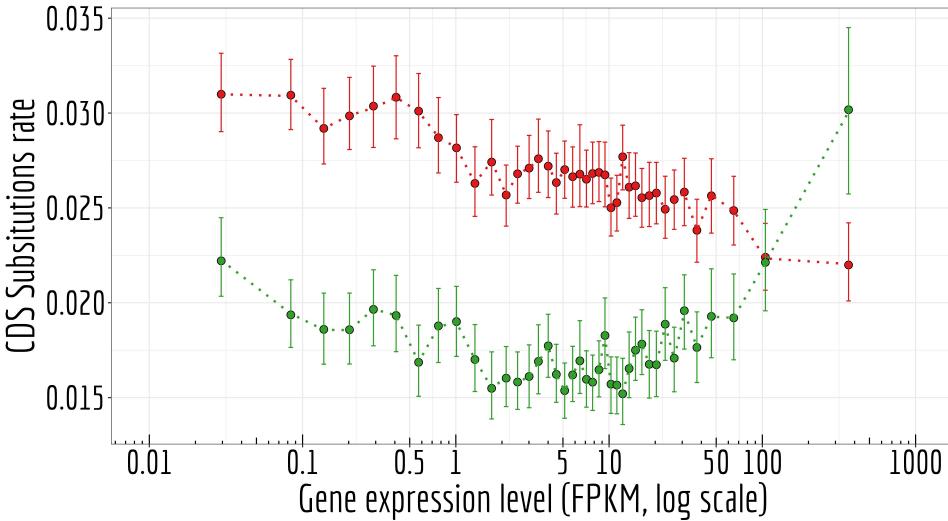
We defined the ancestral allele invoking at most one substitution event to explain the observation on the three species

- If $X = Y$ or $X = Z \rightarrow$ ancestral = X (i.e. no substitution)
- If $Y = Z$ and $Y \neq X \rightarrow$ ancestral = Y (i.e. substitution $Y \rightarrow X$)
- Else \rightarrow ancestral = Undefined

B

POC for non ambiguous amino acid

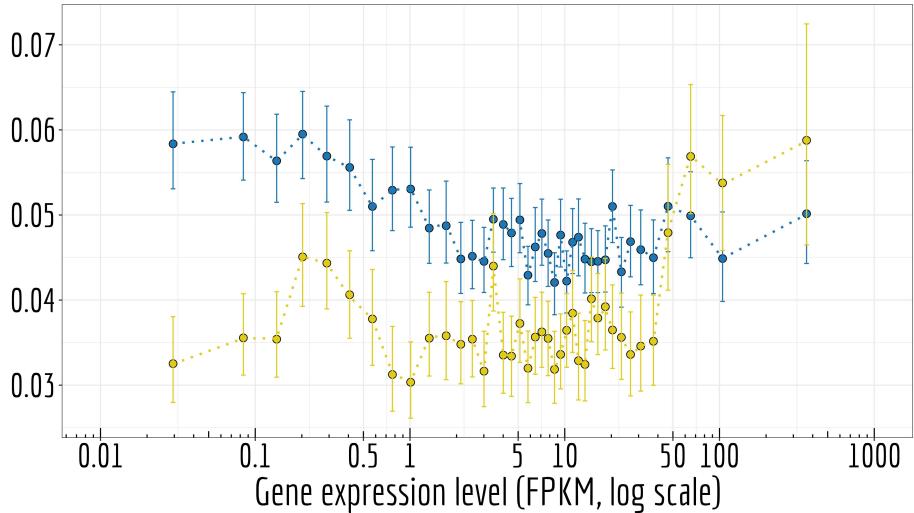
- non-POC \rightarrow POC
- POC \rightarrow non-POC

**C**

Wobble G:U for ambiguous duets

- watson-crick (NNC) \rightarrow wobble (NNT)
- wobble (NNT) \rightarrow watson-crick (NNC)

CDS Substitutions rate

**D**

Wobble I:C

- watson-crick (NNT) \rightarrow wobble (NNC)
- wobble (NNC) \rightarrow watson-crick (NNT)

CDS Substitutions rate

