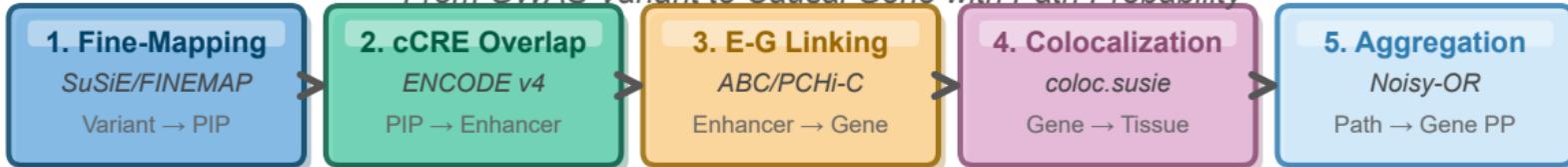
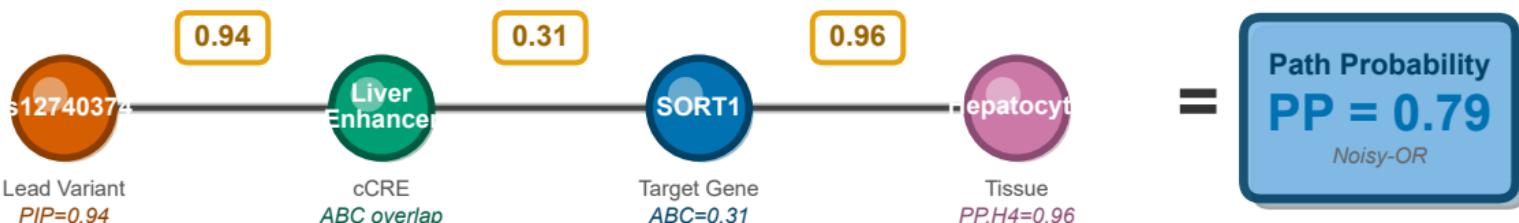


# Mechanism-First Causal Graph Framework

From GWAS Variant to Causal Gene with Path Probability



## Example: SORT1 Locus (1p13, LDL-Cholesterol)



$$\text{Single Path: } P_{path} = PIP \times ABC \times PP.H4 = 0.94 \times 0.31 \times 0.96 = 0.28$$

$$\text{Gene PP} = \text{Noisy-OR(all paths)} = 1 - (1-0.28)(1-0.18)(1-0.09)\dots = 0.79$$



Variant



Enhancer



Gene



Tissue