



$$\begin{array}{c}
 \mathbf{Y} \\
 \text{Expression} \\
 \text{Matrix} \\
 = \\
 \mathbf{X} \\
 \text{Perturbation} \\
 \text{Matrix} \\
 \quad \quad \quad \mathbf{\beta} \\
 \text{Coefficient} \\
 \text{Matrix}
 \end{array}$$

$\left[\begin{array}{c} \text{cells} \\ \vdots \\ \text{genes} \end{array} \right]$
 $\left[\begin{array}{c} \text{cells} \\ \vdots \\ \text{perturbations} \end{array} \right]$
 $\left[\begin{array}{c} \text{perturbations} \\ \vdots \\ \text{genes} \end{array} \right]$