Simulation set up

To determine the required sample size for estimating reliable cut points in CSF and Plasma, simulations were conducted using a bivariate mixture model. The model was run with varying sample sizes for CSF and Plasma to assess the impact of sample size on the accuracy of cut point estimation.

$$f\begin{pmatrix} y^{\text{csf}} \\ y^{\text{plasma}} \end{pmatrix} = \sum_{k=1}^{K} \pi_k \cdot N\left(\begin{array}{c} \mu_k^{\text{CSF}} \\ \mu_k^{\text{Plasma}} \end{array}, \Sigma \right)$$

$$\text{where } \mu_k^{\text{csf}} = (0.05, 0.1), \mu_k^{\text{plasma}} = (0.08, 0.1), \Sigma = \begin{pmatrix} 0.0001082 & 0.0000375 \\ 0.0000375 & 0.0001030 \end{pmatrix}$$

Scatter plot