Supplementary Material

An example of the design matrix, X_{si}, for the i-th individual in the s-th subset (see Equation 2 of Section 3.3) is provided below. This representation is based on a model including the covariates: gene, metabolic concentration, age, gender and the two-way interaction between gene and metabolic concentrations.

$$
X_{si} =
\begin{array}{ccccccccccccc}
 & \mu & g_1 & g_2 & \cdots & g_{G-1} & conc. & age & gender & g_1 * conc. & g_2 * conc. & \cdots & g_{G-1} * conc. \\
\left[\begin{array}{c}\\\\\\\\\\\end{array}\right. &
\begin{array}{c}1\\1\\\vdots\\1\\1\end{array} &
\begin{array}{c}1\\0\\\vdots\\0\\0\end{array} &
\begin{array}{c}0\\1\\\vdots\\0\\0\end{array} &
\begin{array}{c}\cdots\\\cdots\\\vdots\\\cdots\\\cdots\end{array} &
\begin{array}{c}0\\0\\\vdots\\1\\0\end{array} &
\begin{array}{c}0.3\\0.3\\\vdots\\0.3\\0.3\end{array} &
\begin{array}{c}30\\30\\\vdots\\30\\30\end{array} &
\begin{array}{c}1\\1\\\vdots\\1\\1\end{array} &
\begin{array}{c}0.3\\0\\\vdots\\0\\0\end{array} &
\begin{array}{c}0\\0.3\\\vdots\\0\\0\end{array} &
\begin{array}{c}\cdots\\\cdots\\\vdots\\\cdots\\\cdots\end{array} &
\begin{array}{c}0\\0\\\vdots\\0.3\\0\end{array} &
\left.\begin{array}{c}\\\\\\\\\\\end{array}\right]
\end{array}
$$