

$$P(5mC|y_{met}, y_{unmet}) = \frac{P(y_{met}, y_{unmet}|5mC)P(5mC)}{P(y_{met}, y_{unmet})}$$

$$Posterior(\Delta 5mC_{tumor-margin}) = Posterior_{tumor}(5mC) - Posterior_{margin}(5mC)$$

$$Prior_{margin}(5mC) = \begin{cases} Beta_{low}(\alpha_{low}, \beta_{low}), & \text{with } \pi_{margin} \\ Beta_{high}(\alpha_{high}, \beta_{high}), & \text{with } 1 - \pi_{margin} \end{cases}$$

$$\pi_{margin} = N_{n < cutoff} / N$$

$$Posterior_{margin}(5mC) = \begin{cases} Beta(y_{met} + \alpha_{low}, y_{unmet} + \beta_{low}), & \text{with } \pi_{margin} \\ Beta(y_{met} + \alpha_{high}, y_{unmet} + \beta_{high}), & \text{with } 1 - \pi_{margin} \end{cases}$$

$$\Delta 5mC_{tum-mar} = \frac{\#M_{tum}}{(\#M_{tum} + \#U_{tum})} - \frac{\#M_{mar}}{(\#M_{mar} + \#U_{mar})}$$

$$Prior(5mC) = \begin{cases} Beta_{low}(\alpha_{low}, \beta_{low}), & \text{with } \pi \\ Beta_{high}(\alpha_{high}, \beta_{high}), & \text{with } 1 - \pi \end{cases}$$

$$\pi = N_{n < cutoff} / N$$

$$Posterior(5mC) = \begin{cases} Beta(y_{met} + \alpha_{low}, y_{unmet} + \beta_{low}), & \text{with } \pi \\ Beta(y_{met} + \alpha_{high}, y_{unmet} + \beta_{high}), & \text{with } 1 - \pi \end{cases}$$

$$Posterior(5mC_A - 5mC_B) = Posterior(5mC_A) - Posterior(5mC_B)$$