## **Description of Supplementary Files**

File name: Supplementary Data 1

Description: List of significant associations identified in the training sets.

File name: Supplementary Data 2

Description: List of validated pan-cancer biomarkers in gCSI.

File name: Supplementary Data 3

Description: List of pre-validated breast biomarkers in GRAY.

File name: Supplementary Data 4

Description: List of validated breast biomarkers in UHN.

File name: Supplementary Data 5

Description: List of drugs in GDSC, CCLE, gCSI, GRAY and UHN.

File name: Supplementary Data 6

Description: List of cell lines screened in GDSC, CCLE, gCSI, GRAY and UHN.