Cohort structured by Dabrafenib pairwise response similarity driver mutation 0 BAP1 GNAQ BRAF V600x BRAF non V600x NRAS 2 or more GNA11 samples b) EMD pERK evaluations Treatment strength Predicted responses of marker pERK c) d) Conditional CellOT vs other models 1.5 3.5 0.8 dq 2.5 1.0 pERK EMD(observed, ood) Change in pERK 0.5 EMD(control, t 0.0 H 1.0 BRAF V600 positive -8 False -1.5True 0.0 -10 False True Conditional CellOT (OOD) CellOT (IID) CellOT (OOD) BRAF v600 positive average cAE scGen CellOT Predicted Dabrafenib pERK marginals of holdout samples e) Model CellOT (conditional) CellOT treated control BRAF v600 positive 0.4 -0.5 0.2 0.4 -1.0 0.50 0.4 -0.50 0.25 0.2 0.25 0.00 1 -2.5 0.0 2.5 5.0 -2.5 2.5 BRAF v600 negative 1.0 -0.4 0.50 0.50 0.50 0.5 -0.25 0.25 0.0 2.5 5.0 7.5 10.0 0.0 2.5 5.0 7.5 0.3 -0.3 0.2 -0.2 0.5 -0.2 2.5 0.6 -0.4 -0.4

0.2 -

0.2

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