

BUILDING SEX-SPECIFIC SYNTHETIC LETHALITY NETWORK IN CANCER - TEMP NAME

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References

- Cheng K, Nair N U, Lee J S, and Ruppin E (2021). Synthetic lethality across normal tissues is strongly associated with cancer risk, onset, and tumor suppressor specificity. *Science advances* 7(1), eabc2100.
- Lee J S, Nair N U, Dinstag G, Chapman L, Chung Y, Wang K, Sinha S, Cha H, Kim D, Schperberg A V, et al. (2021). Synthetic lethality-mediated precision oncology via the tumor transcriptome. *Cell* 184(9), 2487–2502.
- Shen J P and Ideker T (2018). Synthetic lethal networks for precision oncology: promises and pitfalls. *Journal of molecular biology* 430(18), 2900–2912.
- Shohat S and Shifman S (2022). Gene essentiality in cancer cell lines is modified by the sex chromosomes. *Genome Research* 32(11-12), 1993–2002.