

UNIVERSIDAD DE SANTIAGO DE COMPOSTELA

MASTER'S THESIS

Predictive model for drug response based on multi-omics patterns

Author:

Luis Ardévol Mesa

External Supervisor:

Shaila Calvo Almeida

Academic Supervisor:

Juan Carlos Vidal Aguiar

*A thesis submitted in fulfillment of the requirements
for the Master in Tecnoloxías de Análise
de Datos Masivos: Big Data*

in the

Universidade de Santiago de Compostela
& Gradiant

February, 2025

Abstract

Predictive model for drug response based on multi-omics patterns

Menyhárt and Gyórfy (2021), Eraslan et al. (2019), Chaudhary et al. (2018), Chakraborty et al. (2018), Vasaikar et al. (2018), Hasin et al. (2017), Kourou et al. (2015), Libbrecht and Noble (2015), Meng et al. (2016), Misra et al. (2019), Cai et al. (2022), Sammut et al. (2022), Topol (2019). The page is kept centered vertically so can expand into the blank space above the title too. . .

Contents

Abstract	ii
Contents	iii
1 Capítulo 1	2
A Anexo 1	3
References	4

1 Capítulo 1

A Anexo 1

References

- Cai, Z., Poulos, R. C., Liu, J., & Zhong, Q. (2022). Machine learning for multi-omics data integration in cancer. <https://doi.org/10.1016/j.isci.2022.103798>
- Chakraborty, S., Hosen, M. I., Ahmed, M., & Shekhar, H. U. (2018). Onco-multi-omics approach: A new frontier in cancer research. *BioMed Research International*, 2018. <https://doi.org/10.1155/2018/9836256>
- Chaudhary, K., Poirion, O. B., Lu, L., & Garmire, L. X. (2018). Deep learning–based multi-omics integration robustly predicts survival in liver cancer. *Clinical Cancer Research*, 24. <https://doi.org/10.1158/1078-0432.CCR-17-0853>
- Eraslan, G., Avsec, Ž., Gagneur, J., & Theis, F. J. (2019). Deep learning: New computational modelling techniques for genomics. <https://doi.org/10.1038/s41576-019-0122-6>
- Hasin, Y., Seldin, M., & Lusis, A. (2017). Multi-omics approaches to disease. <https://doi.org/10.1186/s13059-017-1215-1>
- Kourou, K., Exarchos, T. P., Exarchos, K. P., Karamouzis, M. V., & Fotiadis, D. I. (2015). Machine learning applications in cancer prognosis and prediction. <https://doi.org/10.1016/j.csbj.2014.11.005>
- Libbrecht, M. W., & Noble, W. S. (2015). Machine learning applications in genetics and genomics. <https://doi.org/10.1038/nrg3920>
- Meng, C., Zeleznik, O. A., Thallinger, G. G., Kuster, B., Gholami, A. M., & Culhane, A. C. (2016). Dimension reduction techniques for the integrative analysis of multi-omics data. *Briefings in Bioinformatics*, 17. <https://doi.org/10.1093/bib/bbv108>
- Menyhárt, O., & Györfy, B. (2021). Multi-omics approaches in cancer research with applications in tumor subtyping, prognosis, and diagnosis. <https://doi.org/10.1016/j.csbj.2021.01.009>
- Misra, B. B., Langefeld, C., Olivier, M., & Cox, L. A. (2019). Integrated omics: Tools, advances and future approaches. <https://doi.org/10.1530/JME-18-0055>
- Sammut, S. J., Crispin-Ortuzar, M., Chin, S. F., Provenzano, E., Bardwell, H. A., Ma, W., Cope, W., Dariush, A., Dawson, S. J., Abraham, J. E., Dunn, J., Hiller, L., Thomas, J., Cameron, D. A., Bartlett, J. M., Hayward, L., Pharoah, P. D., Markowitz, F., Rueda, O. M., . . . Caldas, C. (2022). Multi-omic machine learning predictor of breast cancer therapy response. *Nature*, 601. <https://doi.org/10.1038/s41586-021-04278-5>
- Topol, E. J. (2019). High-performance medicine: The convergence of human and artificial intelligence. <https://doi.org/10.1038/s41591-018-0300-7>
- Vasaikar, S. V., Straub, P., Wang, J., & Zhang, B. (2018). Linkedomics: Analyzing multi-omics data within and across 32 cancer types. *Nucleic Acids Research*, 46. <https://doi.org/10.1093/nar/gkx1090>