



Title: The omics era: Proteomics importance in cancer research

Authors: VALLEJO-CARDONA, Alba Adriana, ROJAS-CERVANTES, Karen Olivia, VERDUGO-MOLINARES, Maritza Guadalupe and LIMON-ROJAS, Areli

Editorial label ECORFAN: 607-8695
BCIERMMI Control Number: 2022-01
BCIERMMI Classification (2022): 261022-0001

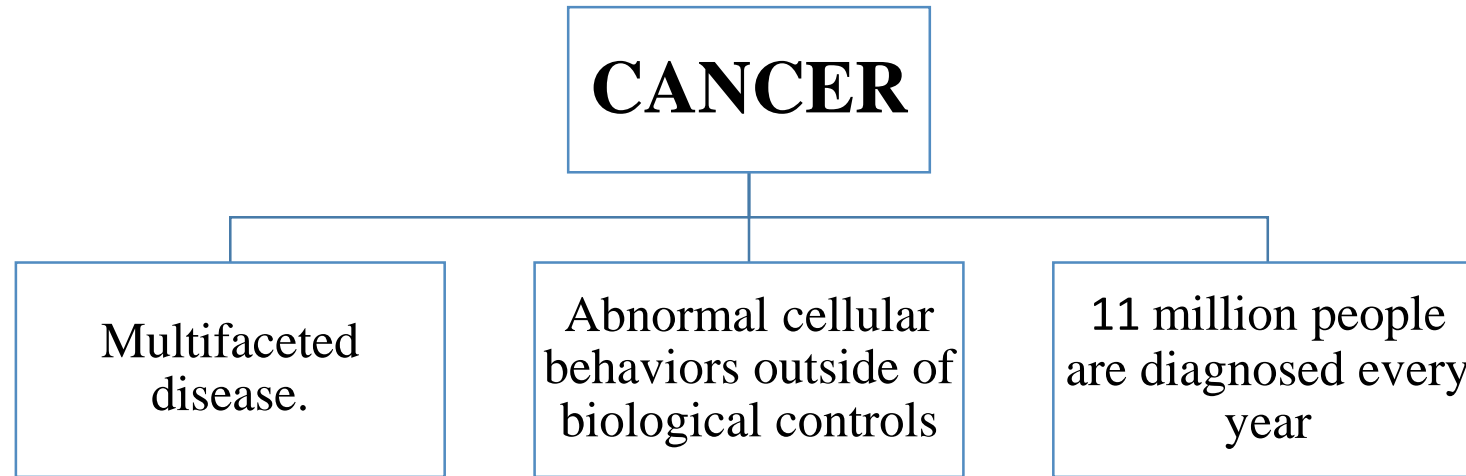
Pages: 6
RNA: 03-2010-032610115700-14

ECORFAN-México, S.C.
143 – 50 Itzopan Street
La Florida, Ecatepec Municipality
Mexico State, 55120 Zipcode
Phone: +52 1 55 6159 2296
Skype: ecorfan-mexico.s.c.
E-mail: contacto@ecorfan.org
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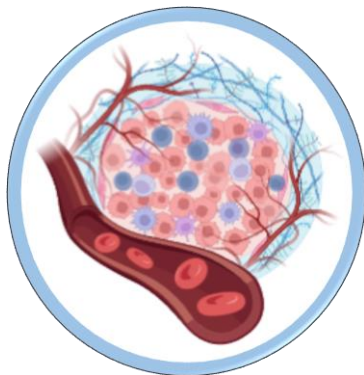
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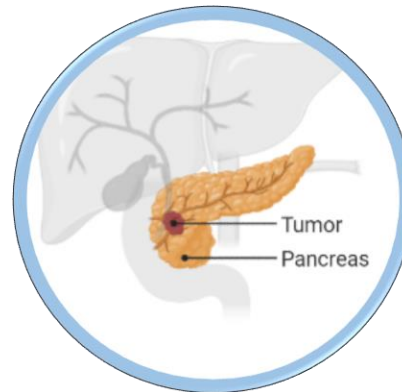
Introduction



Why is the study of cancer important?



Tumor microenvironment

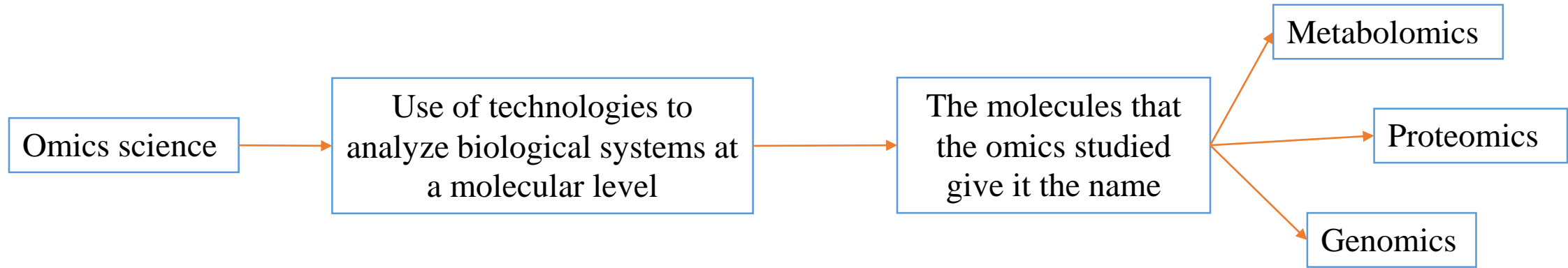


Early detection



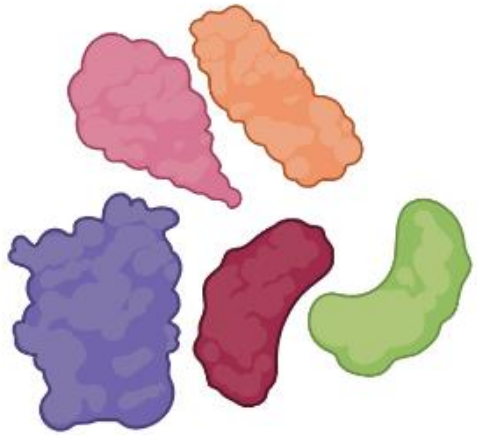
Personalize medicine

Omics: understanding the biological systems



Sites of databases that integrated omics science	
The Cancer Genome Atlas (TCGA)	Catalogue of Somatic Mutations in Cancer (COSMIC)
The Human Protein Atlas	ENCODE project
BAMS	UniProtKB
BioGpS	NIH cancer
GenBank	UNIPROT
Proteomics DB	NCBI Structure Group

Proteomics and its usefulness in the study of cancer



Reflect crucial capacities for the development of the tumor phenotype.

Different in each stage of the disease

Different between diseased and healthy individuals.

Biomarkers or
Therapeutic targets

The study of proteins

Cell line proteomics	Proteomics in murine models	Proteomics in patients
Are useful for the proteomic study of cancer in vivo	Xenografts represent a greater similarity to the mechanisms of cancer in humans	The proteomic analysis of patients can be analyzed with a sample of the tissue of the tumor that has developed
Allow a better understanding of cancer mechanisms and basic biology since for the most part	The environment in which the tumor develops varies significantly	It is an invasive analysis for the patient and on some occasions
They retain the same characteristics as the tumor of origin.	It is necessary to have ethical permits for their manipulation	Biofluids have also made it possible to identify clinically relevant proteins of the disease
Presents easy manipulation and characterization, and high reproducibility		It is necessary to have ethical permits for their manipulation
It is not necessary to obtain ethical permits for its use		

Conclusions

- Proteomics is an omic science that has revolutionized cancer studies by expanding existing knowledge, elucidating growth mechanisms and basic biology, and based on this, applying it to the clinical care of patients.
- Personalized medicine has been based largely on the study of the proteome, since it allows the identification of biomarkers and therapeutic targets to direct a treatment according to the type of pathology and level in which the patient is, and in this way minimizing side effects of current chemotherapies.
- Proteomics allows the study of a variety of samples and models, and it has provided a greater understanding of the mechanisms with which said pathology is addressed, in addition to being able to identify the main function that certain cells have in the behavior of metastasis or resistance to treatment drugs, which has allowed important advances in the adequate treatment of patients, although in some cases the disease is not eradicated, the survival time has presented a significant increase.
- Proteomics is important for the collection of optimal data.

References

- Compton, C. (2020). *Cancer: The Enemy from Within*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-40651-6>
- Ferreira, D., Adegá, F., & Chaves, R. (2013). The Importance of Cancer Cell Lines as in vitro Models in Cancer Methylation Analysis and Anticancer Drugs Testing. In *Oncogenomics and Cancer Proteomics - Novel Approaches in Biomarkers Discovery and Therapeutic Targets in Cancer*. InTech. <https://doi.org/10.5772/53110>
- Kwon, Y. W., Jo, H.-S., Bae, S., Seo, Y., Song, P., & Yoon, S. M. (2021). Application of Proteomics in Cancer: Recent Trends and Approaches for Biomarkers Discovery. *Biomarkers Discovery. Front. Med*, 8, 747333. <https://doi.org/10.3389/fmed.2021.747333>
- Lin, S., Yin, Y. A., Jiang, X., Sahni, N., & Yi, S. (2016). *Multi-OMICs and Genome Editing Perspectives on Liver Cancer Signaling Networks*. <https://doi.org/10.1155/2016/6186281>
- Macklin, A., Khan, S., & Kislinger, T. (2020). Recent advances in mass spectrometry based clinical proteomics: applications to cancer research. *Clinical Proteomics*, 17(1), 17. <https://doi.org/10.1186/s12014-020-09283-w>
- Mathé, E., Hays, J. L., Stover, D. G., & Chen, J. L. (2018). The Omics Revolution Continues: The Maturation of High-Throughput Biological Data Sources The Continued Promise of Cancer Informatics. *Yearb Med Inform*, 211–233. <https://doi.org/10.1055/s-0038-1667085>
- Rajesh, S., Cox, M. J., & Runau, F. (2021). Molecular advances in pancreatic cancer: A genomic, proteomic and metabolomic approach. *World Journal of Gastroenterology*, 27(31), 5171–5180. <https://doi.org/10.3748/wjg.v27.i31.5171>
- Parisa Karimi, Armin Shahrokni, & Mohammad R Nezami Ranjbar. (2014). *Implementation of Proteomics for Cancer Research: Past, Present, and Future*. <https://doi.org/10.7314/APJCP.2014.15.6.2433>
- Velásquez-Fernández D. (2011). *Genómica y proteómica: Impacto clínico en cáncer* . Cirujano General Vol. 33 Supl. 1 Last Revision July 2022: <https://www.medigraphic.com/cgi-bin/new/resumen.cgi?IDARTICULO=27653>



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