

SYSTEMS BIOLOGY GROUP LABORATORY



THE SCIENTIFIC GROUP

SAPIENZA UNIVERSITY. Since 1996, our Laboratory is involved in studying how to manipulate the cell-microenvironment cross talk in order to achieve significant therapeutic results. Studies upon Tumor Reversion were performed in different experimental settings, including cells, animals, and randomized clinical trials. Namely, treatment of advanced cancer patients with FFEs proven to counteract efficiently many chemotherapy-induced side effects while improving the overall survival rate.

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VISION

The natural world consists of hierarchical levels of complexity that range from subatomic particles and molecules to ecosystems and beyond.

This implies that, in order to explain the features and behavior of a whole system, a theory might be required that would operate at the corresponding hierarchical level, i.e. where self-organization processes take place.

The Systems Biology Laboratory from the Experimental Medicine Department of La Sapienza (Rome) University is organized into two sections:

- 1) The **Tumor Reversion** laboratory, focusing on those processes that, modulating the cross talk between cancer and their microenvironment can lead to the phenotypic reversion of cancer disease.
 - 2) Endocrine control and **Regulation of Complex Systems**.
- 2) The section **Space Biomedicine Laboratory "Aristide Scano"**, held in association with Thales Alenia Space, dealing with the issue of human life processes in the outer Space.

Role	Name	Position	E-mail	Publications	Keywords
Lab head	Prof. Mariano Bizzarri	Associate professor	mariano.bizzarri@uniroma1.it	https://pubmed.ncbi.nlm.nih.gov/?term=bizzarri+m&sort=date	Carcinogenesis Tumor reversion Endocrine control Space biomedicine
Lab members	Dr Noemi Monti	Post-doc	noemi.monti@uniroma1.it	https://pubmed.ncbi.nlm.nih.gov/?term=monti+n&sort=date	Carcinogenesis Tumor reversion Endocrine control Space biomedicine
	Dr. Alessandro Querqui	PhD student	alessandro.querqui@uniroma1.it	https://pubmed.ncbi.nlm.nih.gov/?term=querqui+a&sort=date	Carcinogenesis Tumor reversion Endocrine control Space biomedicine
	Dr. Guglielmo Lentini	PhD student	guglielmo.Lentini@uniroma1.it	https://pubmed.ncbi.nlm.nih.gov/38060188/	Carcinogenesis Tumor reversion
	Dr. Aurora Piombo	PhD student	aurora.piombo@uniroma1.it	https://pubmed.ncbi.nlm.nih.gov/?term=piombo+a&sort=date	Endocrine control Space biomedicine
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Previous and current research

The Laboratory carries out research activities based on three main research themes:

- 1) Interaction between cells and microenvironment during the processes of differentiation and neoplastic transformation. In particular, three-dimensional models characterized by phenotypic transition are studied and how this can be modulated to promote tumor reversion. These studies have led to a patent being obtained and another is in the process of being perfected.
- 2) Modulation of steroidogenesis with inositol and derived metabolites. The study focuses on the epigenetic and enzymatic modulation of some critical steps of steroidogenesis and has allowed the development of a therapy protocol for polycystic ovary syndrome. The ability of inositol to modulate aromatase activity has also been highlighted. Studies are underway for the creation of 3D models of the theca/granulosa complex and the endometrium.
- 3) Space biomedicine. Space biomedicine and biotechnology studies are the prerogative of the Space Biomedicine Laboratory section, managed together with the Thales Alenia Space company. The entire research group has acquired - for many years - a role of national pre-eminence for studies conducted in microgravity. It has a Random Positioning Machine through which it carries out experiments in microgravity - and has participated/is participating in space missions on the International Space Station. The main focus is the functional behavior, morphological characterization and gene/protein expression during microgravity. A patent on space applications has just been awarded.

Selected Publications (last 5 years)

Monti N, Querqui A, Lentini G, Tafani M, **Bizzarri M**. System Biology Approach in Investigating Epithelial-Mesenchymal Transition (EMT). *Methods Mol Biol.* 2024;2745:211-225. doi: 10.1007/978-1-0716-3577-3_13. PMID: 38060188.

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Tsuchiya, M., Brazhnik, P., **Bizzarri M**, Giuliani, A. Synchronization between Attractors: Genomic Mechanism of Cell-Fate Change. *Int. J. Mol. Sci.* 2023, 24, 11603. <https://doi.org/10.3390/ijms241411603>

Monti N, Dinicola S, Querqui A, Fabrizi G, Fedeli V, Gesualdi L, Catzone A, Unfer V, **Bizzarri M**. Myo-Inositol Reverses TGF-β1-Induced EMT in MCF-10A Non-Tumorigenic Breast Cells. *Cancers (Basel).* 2023 Apr 15;15(8):2317. doi: 10.3390/cancers15082317. PMID: 37190245; PMCID: PMC10136889.

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Verna R, Alalon W, Mursakami M, Hayward CPM, Harrath AH, Alwasel SH, Sumita NM, Atlas O, Fedeli V, Sharma P, Fuso A, Capuano DM, Capalbo M, Angeloni A, **Bizzarri M**. Analytical Performance of COVID-19 Detection Methods (RT-PCR): Scientific and Societal Concerns. *Life (Basel).* 2021 Jul 6;11(7):860. doi: 10.3390/life11070860. PMID: 34357032; PMCID: PMC8305061.

Minini M, Senni A, He X, Proietti S, Liguoro D, Catzone A, Giuliani A, Mancini R, Fuso A, Cucina A, Cao Y, **Bizzarri M**. miR-125a-5p impairs the metastatic potential in breast cancer via IP6K1 targeting. *Cancer Lett.* 2021 Nov 1;520:48-56. doi: 10.1016/j.canlet.2021.07.001. Epub 2021 Jul 3. PMID: 34229060.

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Grants/Projects/Open Positions/Conferences

OncoTrout, OvoIno, OvoSteroido, OvoSpace, Orion, BabyMoon, GraviCuore,

Links

link
<https://www.sbglab.org/>

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