



**RESEARCH TOPIC-MEM9  
GENETIC AND EPIGENETIC IDENTITIES OF CARDIOVASCULAR DISEASES**

**Curriculum MEM Standard**

**Laboratory name:** Molecular Cardiology, Humanitas University

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**Abstract**

Our group has been studying the molecular mechanisms of cardiovascular diseases, in particular heart failure and atherosclerosis. In our laboratory we try to approach the complexity of these diseases through an integrative approach aimed at understanding the genetics and epigenetics beneath the pathological processes. More recently, we started defining the relevance of immune mechanisms underlying cardiovascular diseases through single cell sequencing and FACS analysis approaches, focusing in particular on the interaction between the immune system cells and other parenchymal cells of the heart and in the arteries in disease. We plan to create a clinical database of human cardiovascular diseases integrated with human specimen correlates in order to translate information gathered from basic science studies

**Main technical approaches**

Genetically modified mice, in vitro and in vivo cardiovascular physiology, ChIP-sequencing, single cells genetic analysis through RNA sequencing and bioinformatics; human biobanking and clinical data-base integration

**Scientific references**

- 1.Papait R, Serio S and Condorelli G: The role of the epigenome in heart failure, *Physiol Rev*,10.1152/physrev.00037.2019
- 2.Martini E, Kunderfranco P, Peano C, Carullo P, Cremonesi M, Schorn T, Carriero R, Termanini A, Colombo FS, Jachetti E, Panico C, Faggian G, Fumero A, Torracca L, Molgora M, Cibella J, Pagiatakis C, Brummelman J, Alvisi G, Mazza EMC, Colombo MP, Lugli E, Condorelli G,\* Kallikourdis M\*. Single cell sequencing of mouse heart immune infiltrate in pressure overload-driven heart failure reveals extent of immune activation. *Circulation* 2019 Dec 17;140(25):2089-2107. doi: 10.1161/CIRCULATIONAHA.119.041694



3.Salvarani N, Crasto S, Miragoli M, Paulis M, Kunderfranco P, Forni A, Dal Ferro M, Sinagra G, Vezzoni P, Faggian G, Condorelli G\*, Di Pasquale E: Lamin A/C mutations induce cardiac conduction defects through an epigenetically-mediated reduction of sodium currents: a study in a iPSC-derived model of cardiac laminopathy, Nature Comm, May 22;10(1):2267. doi: 10.1038/s41467-019-09929-w

4.Hall I, Climent M, Quintavalle M, Farina FM, Schorn T, Zani S, Carullo P, Kunderfranco P, Civilini, E., Condorelli G\*, and Elia L: Circ\_Lrp6, a circular RNA enriched in vascular smooth muscle cells, acts as a sponge regulating miRNA-145 function Circ Res, 2019 Feb 15;124(4):498-510

5.Papait,S, Serio, S., Pagiatakis, C., Rusconi, F., Carullo, P., Mazzola, M., Salvarani, N., Miragoli, M., Condorelli, G (2017): Histone methyltransferase G9a is required for cardiomyocyte homeostasis and hypertrophy, Circulation, 2017 Aug 4. pii: CIRCULATIONAHA.117.028561, 136(13):1233-1246

#### **Type of contract**

Scholarship of € 21.000 gross per year awarded by Istituto Clinico Humanitas. This sum is subject to IRPEF income tax and exempt from social security contributions.

Borsa di studio pari a € 21.000 annui lordi erogata da Istituto Clinico Humanitas. Importo soggetto a tassazione IRPEF ed esente da contribuzione previdenziale.