# Supervisor Project Idea

**Supervisor**

*Insert a brief CV and/or external link, the total number of publications, the ORCID link, 5 of the most significant/recent publications, and a list of funded projects and awards.* max 300 words

**Biography**: Dott. Marco Tomasetti – Researcher, PhD in Biochemistry and Biophysics, Post-graduate course in Clinical Biochemistry, Biological Science degree.
**Research activity**: Cancer biology and prevention. Study of cancer biology using in vitro models as such as 3D-cell culture, spheroids, organoids, patient-derived organoids, and in vivo animal models. Carcinogenesis induced by environmental and occupational exposure. Genetic and epigenetic modifications (methylation and acetylation) involved in asbestos-related diseases. Identification of biomarkers for early detection and prevention of occupational cancers, including malignant mesothelioma and sinonasal cancers. miRNA profile evaluation and identification of a tumor-specific miRNA as promising serum biomarkers for early cancer diagnosis. MicroRNA involved in cancer development and their use in therapy.
**Publications** N° 101
https://www.univpm.it/Entra/Docenti_1/Medicina_e_chirurgia_1/docname/idsel/995/docname/MARCO%20TOMASETTI,
**ORCID**
https://orcid.org/0000-0001-5036-7052,
**5 of the most significant/recent publications**
1. **Tomasetti M**, Monaco F, Rubini C, Rossato M, De Quattro C, Beltrami C, Sollini G, Pasquini E, Amati M, Goteri G, Santarelli L, Re M. AGO2-RIP-Seq reveals miR-34/miR-449 cluster targetome in sinonasal cancers. PLoS One. 2024;19(1):e0295997.
2. Monaco F, De Conti L, Vodret S, Zanotta N, Comar M, Manzotti S, Rubini C, Graciotti L, Fulgenzi G, Bovenzi M, Baralle M, **Tomasetti M**, Santarelli L. Force-feeding malignant mesothelioma stem-cell like with exosome-delivered miR-126 induces tumour cell killing. Transl Oncol. 2022;20:101400.
3. Re M, **Tomasetti M**, Monaco F, Amati M, Rubini C, Foschini MP, Sollini G, Gioacchini FM, Pasquini E, Santarelli L. NGS-based miRNome identifies miR-449 cluster as marker of malignant transformation of sinonasal inverted papilloma. Oral Oncol. 2021;122:105554.
4. Monaco F, Gaetani S, Alessandrini F, Tagliabracci A, Bracci M, Valentino M, Neuzil J, Amati M, Bovenzi M, **Tomasetti M**, Santarelli L. Exosomal transfer of miR-126 promotes the anti-tumour response in malignant mesothelioma: Role of miR-126 in cancer-stroma communication. Cancer Lett. 2019;463:27-36.
5. **Tomasetti M**, Re M, Monaco F, Gaetani S, Rubini C, Bertini A, Pasquini E, Bersaglieri C, Bracci M, Staffolani S, Colomba M, Gregorini A, Valentino M, Tagliabracci A, Bovenzi M, Neuzil J, Amati M, Santarelli L. MiR-126 in intestinal-type sinonasal adenocarcinomas: exosomal transfer of MiR-126 promotes anti-tumour responses. BMC Cancer. 2018;18(1):896.

**list of funded projects and awards**
Bando VALUE- PoC PNRR 2022 (Decreto Rettorale nr. 748/2023 del 18/07/2023)

**Research Group Description**

*Provide the name the reference department and a brief description of the research group, including external links, and available instrumentations and infrastructures.* max 300 words

**The Department of Clinical and Molecular Sciences provide research and teaching activity in several subject area.**

The research group of Occupational Medicine is focused on the study of asbestos-induced carcinogenesis and asbestos-related diseases including lung cancer and malignant pleural mesothelioma. Recently, is involved in a PNRR project (Heal Italia) aimed to evaluate the exposome in relation to the epigenetic changes in term of DNA and RNA methylation profile and miRNA levels induced by asbestos exposure that could be translated into changes in transcriptome, proteome, and metabolome biomarkers. The group is also involved in a POC project "miRNA for the treatment of cancer, EXO-ONCO-MIR".

The research involves molecular biology techniques and cellular 'in vitro' models including 3D cell culture such as spheroids and organoids from patients. The clinic of occupational medicine provides for biological samples (serum and blood cells) of subjects previously and currently exposed to carcinogens including asbestos. In addition, the occupational medicine group closely collaborated with the clinic of Diagnosis and Therapy of Diffuse Infiltrative Pulmonary Diseases, Pleural Pulmonary Diseases and Adult Bronchiectasis, University Hospital of Marche, Ancona, who provides for biological samples such as pleural effusion, lung and pleural biopsies of patients affected by lung cancer and malignant pleural mesothelioma. Recently, has been included in 'PredicMeso platform', an international network of researchers from across the UK and worldwide interested in the study of mesothelioma (https://www.predictmeso.com).

The department is equipped for cell culture, quantitative and digital RT-PCR (qRT-PCR, dRT-PCR), centrifuges and ultra-centrifuges, spectrometry, Cytometry, cell sorting analysis, optical-fluorescent and confocal microscopes.

**Title and goals**

*Provide the title of the topic and a short summary of the project idea.* max 200 words

**Title: Acting on miRNA expression to overcame drug-resistance of thoracic malignancy**

Chemoresistance is a hallmark of thoracic malignancy management including malignant pleural mesothelioma (MPM) and lung cancer (LC). The cancer heterogeneity, stroma environment, immunological factors, as well cancer stem cells (CSCs) all contributed to the acquirement of the chemo-resistant phenotype.

Several studies have focused on miRNAs' impact on chemotherapeutic resistance in cancers. There have also been several meta-analyses and systematic reviews considering the link between miRNAs and chemoresistance and disease recurrence. Therefore, the identification of a specific drug-resistance miRNA profile may predict drug response and contribute to sensitize cancer cells to the standard treatment.

Organoid from patients display similar genotypic and phenotypic characteristics, making them ideal for investigating individualized treatment strategies and for integration as a core platform to be used in prediction models.

Using organoid-derived patient model, the project will identify a miRNA panel involved in chemotherapy (CHT) and immune therapy (IMT) resistance in thoracic malignancies. The identified miRNAs will be check for their capacity to sensitize cancer-resistant cells to CHT and IMT by restoring multiple pathways. Next, by evaluating miRNA pathways involved in CHT and IMT resistance, biomarkers for prediction of drug response will be identified.

The identification of miRNA-pathways involved in drug resistance will open new approach to overcome chemoresistance. These drug resistance-related miRNAs may be used as promising biomarkers for predicting drug response or as potential therapeutic targets for treating patients with thoracic malignancies. the regulation of many molecular pathways. Several studies have focused on miRNAs' impact on chemotherapeutic resistance in cancers.

**Contact details** (*including email address of the supervisor*)

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