



## RESEARCH TOPIC MEM21

# Utilization and validation of disruptive liquid biopsy methodology in Ulcerative Colitis Curriculum MEM Standard

### Laboratory name:

Gastrointestinal Immunopathology laboratory

### Pre-clinical Supervisor:

Dr. Stefania Vetrano

[stefania.vetrano@hunimed.eu](mailto:stefania.vetrano@hunimed.eu)

### Abstract

Ulcerative colitis (UC) is a chronic inflammatory disease for which unmet clinical treatment needs exist, presumably due to the limited knowledge of the underlying mechanisms of immunopathology and the lack of predictive biomarkers that would allow proper patient stratification. This project aims at the ultrasound-enabled gut liquid biopsy as non-invasive approach for the identification of new “microinvasive” biomarkers suitable to reflect clinically relevant tissue-based signatures of disease progression and/or response to treatment. To this end, in the first two years of the project we will assess the ultrasound-induced bioeffects on the intestinal mucosa in vitro, on different primary mucosal cell populations; and in vivo on experimental models of colitis, and during the third year we will translate these data on UC patients for the identification in the blood of microvesicles as potential biomarkers for monitoring the disease.

### Main technical approaches

To carry out this project, different approaches will be applied: molecular biology for the isolation and analysis of nucleic acids and microvesicles; cellular for the isolation and culture of primary intestinal cells; and preclinical models of chronic intestinal inflammatory diseases for the validation of ultrasounds. The effects of ultrasound on different cell populations will be evaluated by FACS, ELISA, and Western blotting. The microvesicles isolated from peripheral blood of UC patients will be analyzed by NanoSight NS300.

### Scientific references

Petti L et al. J Exp Clin Cancer Res. 2020 Nov 23;39(1):253. doi: 10.1186/s13046-020-01740-6

Romano B et al. Stem Cells. 2019 Jul;37(7):973-987. doi: 10.1002/stem.3010. Epub 2019 May 14.

E Sala, et al. Gastroenterology. 2015 Jul;149(1):163-176.e20. doi: 10.1053/j.gastro.2015.03.013. Epub 2015 Mar 17.



### **Type of contract**

PhD scholarship of € 18.000 gross per year awarded by Humanitas University. This sum is exempt from IRPEF income tax according to the provisions of art. 4 of Law no. 476 of 13th August 1984, and is subject to social security contributions according to the provisions of art. 2, section 26 and subsequent sections, of Law no. 335 of 8th August 1995 and subsequent modifications.

Borsa di dottorato pari a € 18.000 annui lordi erogata da Humanitas University. Importo non soggetto a tassazione IRPEF a norma dell'art. 4 della L. 13 agosto 1984 n. 476 e soggetto, in materia previdenziale, alle norme di cui all'art. 2, commi 26 e segg., della L. 8 agosto 1995, n. 335 e successive modificazioni.