| Principal Investigator | Di Tommaso Luca |
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| Hosting institution | Università Humanitas |
| Proposal title | Dissecting the transcriptomic profile of endothelial cells (EC) in VETC+ cancers pave the way to a true personalized med |
| Keywords | Tumor-stroma interaction; Endothelial cells; Hepatocellular carcinoma (HCC); Biomarkers; Liquid biopsy |
| PhD project description | The student will coordinate with clinical collaborators to prospectively collect fresh tumor and adjacent normal tissues from hepatocellular carcinoma (HCC), clear cell renal cell carcinoma (ccRCC) and thyroid cancer (TC) patients, to oversee ethical approvals, patient consent procedures, and sample biobanking. The student will optimize protocols for tissue dissociation and fluorescence-activated cell sorting (FACS) to isolate Endothelial Cell (EC) populations based on established surface markers. She/he will prepare single-cell suspensions, perform library construction with the 10x Genomics platform, and sequence samples on Illumina instruments. She/he will apply rigorous quality control pipelines, align reads, and generate cell-by-gene matrices. Employing bioinformatics tools such as Seurat and Scanpy, the student will identify distinct EC clusters, perform statistical differential expression analyses, and compare transcriptional signatures across cancer types. They will build pseudotime trajectories to infer lineage relationships and uncover cluster-specific markers. The student will validate the identified EC clusters and markers using image-based techniques including multiplex immunofluorescence, in situ hybridization, and immunohistochemistry. The student will also explore potential therapeutic targets by cross-referencing cluster-specific genes with drug databases and conducting preliminary functional assays in vitro. Throughout the PhD, the student will attend journal clubs, present findings at international conferences, and contribute to manuscript preparation. They will gain expertise in translational cancer biology, single-cell genomics and computational analysis, ultimately advancing our understanding of multi-tumor VETC-driven metastasis and identifying novel avenues for therapeutic intervention. |
| Main topics of the lab | Precision Medicine Lab |
| Short description of the lab activity | The laboratory, directed by S. Piscuoglio, hosts three research groups. The first, led by Professor Piscuoglio, develops and uses human tumor organoids to study new drugs. The second, led by Professor L. Di Tommaso, studies the microenvironment of liver cancer and tests new drugs using organoids enriched with cells from the vascular and immune microenvironment. The third, led by Professor C. Ng, handles all bioinformatics data analysis. |
| Main research area | Molecular Therapy |

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| **Group composition** | The whole group includes 3 post-doc, 6 PhD students, 5 technicians and 5 students In particular my team is made by 1 post-doc, 2 PhD students (both doctors), 1 technician and 1 medical student. |
| **Institutional page link** | https://www.humanitas-research.com/groups/piscuoglio-group/ |
| **Lab website link** | |
| **Social media link** | |
| **Lab bibliography** | Vessels Encapsulating Tumor Clusters (VETC) Is a Powerful Predictor of Aggressive Hepatocellular Carcinoma. Renne SL, Woo HY, Allegra S, Rudini N, Yano H, Donadon M, Viganò L, Akiba J, Lee HS, Rhee H, Park YN, Roncalli M, Di Tommaso L HEPATOLOGY 2020 Jan; 71: 183 |