

Instruments: An automated ImageXpress^{MICRO} XLS HCS System (Molecular Devices) for fluorescence or transmitted light (phase contrast) microscopy (for 96, 384 or 1536 wells plates, or slides). The system is equipped with a solid state LED light source (excitation from 380 nm to 650 nm); three Plan Fluor objectives (4x, 10x and 20x), five excitation/emission filters cubes (for fluorophores with characteristics similar to DAPI, FITC, CY3, CY5 and TEXAS RED) and a cooled 4.66 MegaPixels sCMOS. The system also includes an environmental control module (temperature, humidity and Air/CO₂ mixture) for Live Cell Imaging and Time-Lapse experiments. The lab also has fully equipped cell culture rooms, with biosafety laminar flow cabins, CO₂ incubator, -80oC ultra freezers, nitrogen tank, inverted transmitted light microscope with phase contrast, refrigerated centrifuges for tubes and plates, vacuum pumps, 37°C water baths, ALPS 50 V-Manual plate Heat sealer (Thermo Fisher), automated electronic multi-channel pipets, magnetic stands for cell separation, rockers, vortexes and various other equipment, providing all primary tools necessary for the execution of HCS assays.

Softwares: The system is equipped with commercial softwares for automated image acquisition, quantification and data analysis (MetaXpress High Content Image Acquisition and Analysis software) and for the analysis of the large content of data generated from screenings (AcuityXpress Cellular Informatics software); however, image and data analysis is preferentially carried with freely available open-source software, including: CellProfiler for the automated image processing and quantitative analysis of the acquired images and CellProfiler Analyst (CPA), which provides a supervised machine learning system that can be trained to automate the recognition of specific and complex cell phenotypes. Finally, quantitative data from the HCS experiments can be analyzed using KNIME. Importantly, these software pipelines can be easily interchanged between users and specialists, streamlining the analysis process.

Libraries: MISSION Human miRNA Mimic Library miRBase v21 with 2,754 mature miRs (Sigma-Aldrich), and a set of more than a 200 siRNAs against 10 0mRNA transcripts coding for critical components of important signaling pathways.

Microarray Functional Genomics: In addition, the LLSFBio is equipped with a High Resolution Microarray Scanner (2um/pixel) with an automated slide carousel (Agilent), an Axon GenePix 4000B Scanner for opaque microarrays (Molecular Devices), and all the additional hardware and softwares for processing microarray experiments; including, a NanoVue spectrophotometer (GE) for DNA/RNA/Protein quantitation, Thermal cyclers, wet and dry thermal baths, hybridization oven, etc. Trained specialists can generate data derived from any microarray type (including, oligonucleotides, antibody or protein microarrays). Among the possibilities, the expression levels of mRNAs, lincRNAs or microRNAs can be globally evaluated at a genome-wide level, allowing the molecular characterization of specific cell types or the study of transcriptomic changes under different culture conditions or following perturbations with different treatments (such as drugs, microRNAs, siRNAs, etc).