Flow Cytometry

www.cambridgecancer.org.uk/research/coreresources/flowcytometry

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The Flow Cytometry core facility at the Cancer Research UK Cambridge Research Institute provides state-of-the-art flow cytometric instrumentation, technical expertise, training, and software analysis in a collaborative environment.

Our mission is to develop cytometric technologies that will best assist Cancer Research UK researchers in finding answers for the treatment, prevention, and understanding of cancer.

Scientific Achievements

In its first year the facility has played a key role in several experiments using the Imagestream, a piece of equipment that combines flow cytometry with microscopy. We have collaborated with David Neal's Group to quantify the integration of clathrin and tublin staining on DT40 cells and to isolate the mitotic phases; as well as examining the localization of Lysine-rich CEACAM-1-associated protein into the cytoplasm and nucleoli in cancer tissue. We have been developing novel techniques for phagocytosis assays for use with the Imagestream, so that scientists can quantify the degree of phagocytosis with imaging.

Studies in development include the isolation of circulating tumour cells in human peripheral blood, functional studies of gut side populations, chromosome sorting for DNA sequencing and CHIP arrays, and a collaborative pilot study with Hemato-Oncology Diagnostic Service at Addenbrooke's Hospital in leukaemia diagnosis.

Services

Our lab offers a full range of educational and cytometric services that includes immunophenotyping, cell cycle analysis, translocation and co-localization of cell activation markers, chromatin density, and apoptotic and necrotic analysis. In addition we are capable of performing cell sorting for researchers so that they can isolate cell populations needed for further studies. Users are offered an array of educational programs that teach them the science of flow cytometry, including theory, anatomy and its applications. We offer additional workshops on data analysis using all of our software programs and on the practical applications of current protocols in cytometry.

Equipment

1 FACS Aria SORP (BD Biosciences) – this is a high-speed sorter. It is equipped with 5 lasers, a UV, 407nm, 445nm, 488nm, and 633nm. Our optical configuration allows us to see 3 UV, 6 Violet, 3 Indigo, 6 Blue and 3 Red parameters.

1 LSR II (BD Biosciences) – this is an analytical bench top flow cytometer. It is comprised of four lasers: a UV, a Violet (407nm), a Blue (488 nm) and a Red (633 nm). Our optical configurations allow users to see 2 UV, 6 Violet, 7 Blue and 3 Red fluorescent parameters.

2 FACS Caliburs (BD Biosciences) – these are routinely used for phenotyping (to look at antigen, cytokine, or GFP expression), cell cycle analysis, and apoptosis studies. They are equipped with a 488nm and 635nm lasers that allow users to see 6 parameters.

1 ImageStream (Amnis) – this is a combination of flow cytometry and microscopy. It takes a picture of each cell as it passes through a flow cell and gives individual fluorescent wavelengths or a composite image for analysis, as well as quantitatively analyzing all fluorescence. There is a 488nm laser that emits to 6 parameters that can be observed and saved.

1 RoboSep (Stem Cell Technologies) – this is a magnetic bead separator unit. Its customisable programs allows positive or negative selection of virtually any cell type from any species. Up to four samples can be processed simultaneously.

2 Vicell (Beckman Coulter) – these are cell analyzers capable of measuring cell viability, cell count, and cell size.