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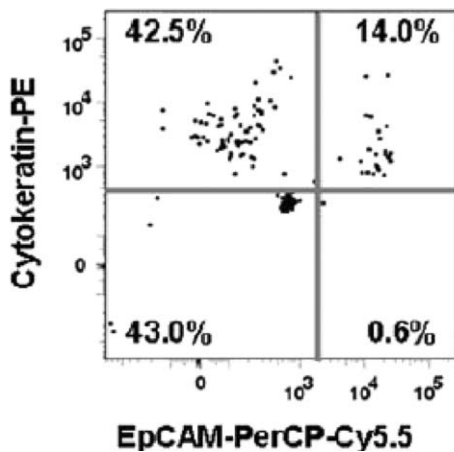

Pre-enrichment: no longer required

Detection of CTCs present at very low numbers in peripheral blood of patients with solid epithelial tumors has been proposed as a powerful non-invasive diagnostic tool for prediction of clinical outcomes but remains technically challenging. In their current work, Hristozova and coworkers showed that by using an electronic threshold during data acquisition tumor cell pre-enrichment for CTC analysis is no longer required. Using this new protocol they confirmed their previous observation of the presence of CTCs in about 30% of patients with locally advanced squamous cell carcinoma of the head and neck region. Apart from CTC enumeration, the authors demonstrate that their protocol can be used for phenotypic characterization of CTCs such as the assessment of expression and activation status of the epidermal growth factor receptor. The authors conclude that this type of analysis within clinical trials might be helpful in the development of personalized cancer treatment.
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Growing up to speed at the leading edge

Many cell types migrate by localizing actin polymerizing factors at their leading edge. The resulting growth of an actin gel then pushes the cell envelope forward to form a thin sheet of cytoplasm called the lamellipodium. Weichsel and coworkers have developed new procedures to measure the orientation distribution of actin filaments at the leading edge of migrating keratocytes. Applying two different image processing algorithms to electron microscopy data correlated with live cell imaging, they showed that the organization of the actin filaments changes in fast versus slow protruding lamellipodia. During fast protrusion, the orientation distribution is dominated by two peaks at +35 and −35 degrees relative to the direction of motion.However,slowly protruding membranes, observed at the front of slowly moving cells and at the lateral flanks of fast moving cells, show a broad peak centered around 0 degrees. The reported correlation between the orientational organization of the lamellipodium and the protrusion speed will help to discriminate between competing model scenarios and to enhance our understanding of this essential cellular process.
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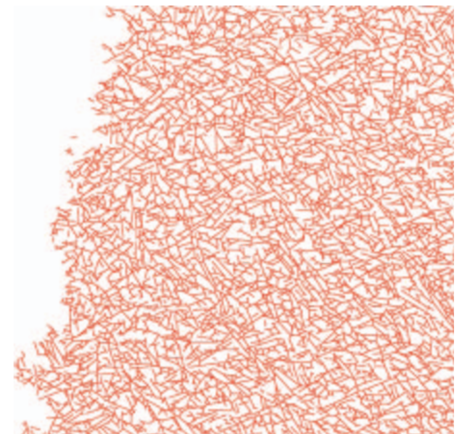

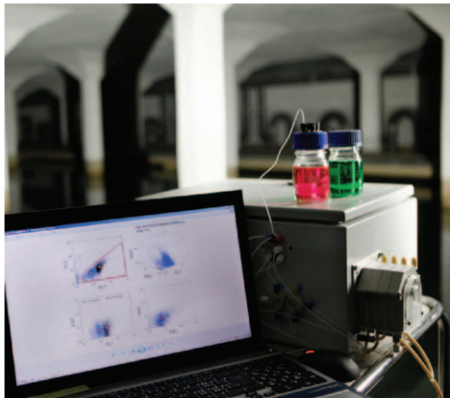
A fully automated staining robot enabling continuous monitoring of drinking water with flow cytometry (photo: G. Lüchinger).

Automated flow cytometry opens new possibilities

Swiss researchers developed a staining robot that connects to commercially available flow cytometers and allows fully automated online analysis of suspended bacteria with a variety of fluorescence dyes. The system described by Hammes and coworkers uses high temperature staining to achieve short measurement intervals (5 minutes), and a high degree of precision can be maintained during at least 24 hours of continuous analysis. This allows detailed, multi-variable characterization of a wide range of dynamic bacterial processes. The researchers have identified three main areas of application namely (1) the understanding and monitoring of biotechnological processes (J Biotechnol 2011; 154:240–247), (2) routine monitoring of drinking water quality (Water Res 2008;42:269–277), and (3) detailed characterization of bacterial disinfection kinetics (e.g., chlorine disinfection). The high measuring interval results in a remarkable data density and enables the visualization of so far unseen process dynamics and variations at the single-cell level.
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DyeCycle Violet-Based Side Population Sorting

Cancer stem cells are a subpopulation of cancer cells critically involved in cancer initiation, metastatic progression, therapy resistance and disease recurrence. In their recent paper, Boesch and coworkers clearly show that side population sorting using the violet laser-excitable DyeCycle Violet is a feasible method to detect and isolate P-glycoprotein-expressing cancer stem cells, as they provide evidence that DyeCycle Violet is transported *via* P-glycoprotein. From their results it can be deduced that side population detection using DyeCycle Violet should be handled with care, since strong P-glycoprotein expression also frequently appears in multidrug-resistant mature cancer cells rather than being a *bona fide* cancer stem cell characteristic. To meet this challenge, the authors suggest that additional controls should be performed to confirm the stem cell nature of a putative cancer stem cell population isolated by means of DyeCycle Violet-based side population sorting.
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