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## Beyond histochemistry: Screening biomarkers in melanoma tissues using soft electrochemical probes

**Tzu-En Lin, Andreas Lesch** and **Hubert H Girault**
Ecole Polytechnique Federale de Lausanne, Switzerland

Visualizing biomarkers in tumors is important for skin cancer diagnosis and the determination of medical treatment strategies. Prevalent methods for revealing biomarkers include immunohistochemistry (IHC) and fluorescence in situ hybridization (FISH). These methods are based on optical microscopy, which can suffer interferences especially when examining melanoma. For instance, melanin generates a colored background and the interpretation of the signals from chromogens of immunohistochemical stains can be interfered. In addition, the read-out of fluorescent staining can be affected by auto-fluorescence and photo bleaching. In this contribution, we discuss the possibility to apply a screening method based on electrochemistry offering opportunities to monitor malignancies through the unequivocal electrochemical detection of biomarkers independent from optical influences. We used a technique called scanning electrochemical microscopy (SECM) where microelectrodes (MEs) are scanned in close proximity to a surface to detect analytes with high spatial resolution. Coupled with immunoassays the local distribution of two melanoma biomarkers, S100 protein and tyrosinase was mapped based on the detection of redox active compounds generated by the enzyme labeled assay. For measuring on skin biopsies and tissue sections from melanoma patients we developed soft ME probes that are gently brushed on the samples like micro-fingers. Employing such versatile probes we could roughly distinguish different melanoma stages based on the distinct distribution of the biomarkers. Finally, we discuss the possibility of identifying cancer cells with the option to generate electrochemically local effectors.

### Biography

Tzu-En Lin is currently a PhD student at Ecole Polytechnique Federale de Lausanne (EPFL), working on biological cell imaging by scanning electrochemical microscopy. Recently, her research has been dedicated to the development of a new scanning electrochemical microscope for biological studies and her work on “banana and skin cancer” has been reported all around the world, including BBC and European media.

tzu-en.lin@epfl.ch

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