



Visualization of oxygenase producing bioactive molecules by mass spectrometry imaging



Time & Date:
April 21, 2021
13:00 – 14:00
Venue: Online (ZOOM)



Speaker:
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Small signaling molecules such as monoamines, prostaglandins, steroid hormones, and gas mediators (NO, CO) are produced by a specific cell types in vivo and regulate various biological phenomena. Altered concentrations of these molecules are responsible for a variety of diseases, and thus their metabolism and receptor systems have been important therapeutic targets. However, the molecular mechanisms of such drugs still remain unclear. For example, the pharmacological mechanisms of immunosuppression by synthetic steroids, and brain monoaminergic interventions by psychotropic drugs remain ambiguous. This is due to the fact that the spatiotemporal dynamics of steroids and monoamines (i.e., production, diffusion and degradation) in vivo is still poorly understood. Furthermore, we hypothesize that there may be unknown cells that produce such small bioactive molecules.

We have developed a highly sensitive imaging mass spectrometry (IMS) technique for imaging the in situ concentrations of monoamines and steroid hormones. By applying this new method to the analysis of human disease specimens, we discovered endocrine disease specific steroid producing cells in adrenal glands. Moreover, we identified novel monoamine neural circuits in the brain which associate with anxiety behavior. These examples show that classical signaling small molecules are not only secreted and diffused within organs, but are also actively produced, transported and accumulated at specific sites, i.e., they are highly regulated in space and time.

It is important to note that all of the above small signaling molecules are produced by oxygenase activity. Therefore, we are now trying to identify novel bioactive molecule-producing cells in vivo by inhalation of stable isotope $^{18}\text{O}_2$ gas in mice and primates and in-situ imaging of newly produced monoamines and steroids (molecules containing ^{18}O) in those organs.

Advance application is required.

Please access <https://forms.gle/2SmmpRc2KjPNpFYw5> and register by

April 18, 2021.

We will send applicants an e-mail including ZOOM Meeting URL, Meeting ID, and Passcode on the day before the seminar.

Please note that in case of too many applications, we may limit the number of participants.

Organized by:

Center for Cancer Immunotherapy and Immunobiology (Phone: 075-366-7453)