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Presentation Abstract

Program#/Poster#: 184.01/SS46

Presentation Title: New perspectives into atomic neuroscience in post-mortem, post-surgical human tissue and cell cultures using synchrotron x-ray fluorescence imaging

Location: WCC Hall A-C

Presentation time: Sunday, Nov 16, 2014, 8:00 AM -12:00 PM

Presenter at Poster: Sun, Nov. 16, 2014, 8:00 AM - 9:00 AM

Topic: ++G.03.a. Staining, tracing, and imaging techniques

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Abstract: Although synchrotron x-ray fluorescence (SXRF) has been used for several decades to study the distribution and colocalization of metals in a number of inorganic or biological specimens, the successful application of SXRF to brain tissue has not been shown in a large body of work until this decade. Improvements in technology have demonstrated the use of SXRF in brain tissue in postmortem preparations. In this presentation, we show the latest developments from our group in (i) cell cultures (ii) post-mortem and (ii) post-surgical human tissue. The increasing sensitivity, accuracy, speed, resolution and computational power of supporting technologies have enabled us to more readily detect cases of suspected metal changes in the brain in human cases not previously considered to have metal-involvement as a factor. Despite challenges of relatively low physiological concentrations of metals in brain tissue and heterogeneity of brain structures, the yearly advancements in SXRF have shown that this imaging may soon exceed the power of analysis of current histological practice in which only individual metals can be evaluated at one time. We will further discuss the technical aspects unique to low-concentration biological tissues that may provide difficulties in data interpretation if not accounted for in post-imaging analysis, but may be overcome with relatively simple controls. Finally, we discuss the large advantages of open cooperative neuroscience practices that can greatly move such basic science techniques rapidly towards translational practices. Specifically, updates to the roadmap towards the human brain metal atlas located at: www.greenneuro.org/atlas

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Keyword (s): TEMPORAL LOBE

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