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Positron emission tomography (PET) contributions to a better understanding of brain function

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Positron Emission Tomography imaging coupled with an increasingly target specific tracer development is providing key insights into brain function in health and disease. Multiple neurochemical correlates to various brain diseases, mental states and personality traits have been uncovered. For example, multi-tracer imaging is revealing the impact of neurodegeneration, such as observed in Parkinson's disease (PD), on several neurotransmitter systems and functional connectivity. At the same time there is an increasing awareness of the network type behavior of the brain and of the importance of the interactions between localized neurochemical alterations and longer-range functional effects. Distinct brain network-type behaviors are also being observed using functional magnetic resonance imaging (fMRI). This emerging knowledge highlights the importance of novel analysis approaches to the PET and/or multi-modality data which focus on identifying specific spatio-temporal patterns characteristics of brain function under different conditions. This talk will provide a brief history of how advances in imaging including radiotracer and instrumentation development as well as advances in data processing algorithms have contributed to revolutionize not only the understanding of brain function, but also the very concept of mental illness.

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