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PET Neuroimaging in Early Phase Drug Development

Wednesday, 3 September 2014 15:00 (30 minutes)

The discovery and development of central nervous system (CNS) drugs is a complex task that requires large investments of time and money with no guarantee of success. Currently it is estimated that it costs around €1 billion to bring each successful drug to market. Imaging techniques, such as positron emission tomography (PET), can provide important information by taking direct biological measurements in tissues of interest in preclinical and clinical species in vivo. These measurements can be divided into three types:

1. Biodistribution - Direct radiolabelling of the drug candidate itself with a positron emitter does not change the properties of the drug and allows for direct measurements of the drugs concentration in tissues of interest. These studies can provide confidence that the drug is crossing the blood brain barrier in humans.
2. Target Engagement - Radiolabelling of the drug target with a probe that provides a specific signal allows for the assessment of whether a cold drug candidate interacts with the target. Such studies, often referred to as occupancy studies, provide valuable information on dose selection early in Phase 1.
3. Measuring Downstream Responses –By employing radiolabelled probes that directly measure physiological or biochemical processes, it is possible measured to measure the downstream impact of drugs on these key biological processes in the body.

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