

# **Automation of $\beta$ -Amyloid Deposit Quantification in Human Brain over Multi-Subjects in [11C]PIB/PET Studies**

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## **Abstract**

Graphical analysis method has been widely used to study the neuroreceptor imaging. The simplified Logan implementing the Simple Reference Tissue Modeling with 3 parameters (SRTM3P) is used to quantify the [11C]PIB (Pittsburgh Compound B) studies. Distribution Volume Ratio (DVR) generated by the Logan procedure is useful for the early diagnosis of the Alzheimer's disease (AD). Cerebellum is the selected reference tissue due the fact that it shows no specific binding of the PIB in the cerebellum region during the PET studies. There are still questions about PIB quantification that have to be answer through multi-subject analysis. An automated PIB quantification procedure algorithm is implemented. This automated procedure will provide a useful tool to facilitate and improve the efficiency of the future quantification studies. This automated procedure contains simplified Logan procedure, the Logan procedure with user selection of reference tissue generated through Automated Anatomic Labeling, the clinical Standard Uptake Value Ratio (SUVR), and the T0 Logan. The automated PIB quantification procedure is executed with different time frame options on 38 normal controls and 10 AD patient from the collaboration data from University of Pittsburg, 12 Normal Controls and 8 homozygous APOE gene

subjects from National Institute of Health. The statistical analysis is done to determine which cerebellum sub-region is the best choice for reference region for early diagnosis of AD.