

# AI application in nuclear medicine

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## ABSTRACT

In the realm of nuclear medicine, the integration of artificial intelligence (AI) has the potential to revolutionize diagnostic and therapeutic practices. My lecture will explore the synergistic relationship between the three fundamental components of nuclear medicine: the tracer, the scanner, and the software. Each component complements the others, forming a cohesive system that enhances the accuracy and efficiency of medical imaging. A focal point of the lecture will be the application of AI in diagnosing Alzheimer's disease (AD). While amyloid PET is a well-known diagnostic tool for AD, AI can also significantly enhance the diagnostic capabilities of FDG PET scans. AI's contributions to nuclear medicine are vast, encompassing lesion detection, characterization, and segmentation, as well as image generation and quality improvement. Notably, AI can generate images from different PET tracers and perform attenuation correction without the need for CT scans. In this lecture, I will introduce Metavol, a free software we developed to simplify the measurement of SUV, metabolic tumor volume (MTV), and total lesion glycolysis (TLG). Metavol aims to streamline the workflow for clinicians and researchers by providing easy-to-use tools for comprehensive image analysis. Additionally, I will present preliminary results from a statistical analysis conducted after anatomical normalization for whole-body PET scans. These findings underscore the potential of AI-enhanced nuclear medicine to provide more precise and individualized patient care. This lecture will provide an insightful overview of how AI is transforming nuclear medicine, offering practical examples and demonstrating the capabilities of innovative tools.