Molecular Imaging of Neurodegeneration: The Way to New Horizons

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Neurodegenerative disorders are chronic and progressive conditions characterized by tissue loss in certain brain systems. They encompass most dementias, movement disorders, amyotrophic lateral sclerosis, Creutzfeldt–Jakob disease, and other diseases. Because the incidence of most of these disorders increases with age, they are of enormous socioeconomic relevance in our aging societies. Among other similarities, the disease-specific trigger events in these disorders are still mainly unknown, and consequently, no preventive or curative treatment is currently available. Optimism for progress in this regard, however, grows as our understanding of underlying molecular pathologies in these disorders steadily increases.

Different molecular imaging techniques are available in clinical care to support a biomarker-based diagnosis of neurodegenerative disorders and in research to support basic research and drug testing. Excitingly, many new tracer classes and molecular imaging concepts are currently entering the neurodegeneration imaging field. They come at the right time, because a paradigm shift is currently under way in which the traditional concept of defining or diagnosing neurodegenerative disorders as a syndromal construct will likely be replaced by a biologic definition or diagnosis of these disorders.

This supplement to *The Journal of Nuclear Medicine* aims to provide an up-to-date overview on the different aspects of molecular imaging in neurodegeneration and a discussion on what the future will bring to the field. For that purpose, we managed to acquire respective top experts. Minoshima et al. discuss the still-relevant role of ^{18}F-FDG PET in the imaging of neurodegeneration (*1*). Chapleau et al. review the current state of amyloid PET imaging as a technology on the edge of entering clinical praxis (*2*), whereas Groot et al. provide an overview on the most driving developments in tau PET imaging (*3*). This is followed by reviews by Wallert et al. and Tiepolt et al. on current opportunities to image dopaminergic and cholinergic neurotransmission in neurodegenerative disorders (*4*,*5*). Masdeu et al. discuss the great potential of imaging neuroinflammation (*6*), and Kenou et al. focus on imaging cyclooxygenases as neuroinflammation targets in neurodegeneration (*7*). Carson et al. review the current state of the recently emerging field of synaptic density imaging in neurodegenerative disorders (*8*). Finally, our group discusses future directions in this most exciting field of molecular imaging of neurodegeneration (*9*). We hope you enjoy reading this supplement.

DISCLOSURE

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