CME Session 1
Inflammation and Infection Committee
Sunday, October 20, 08:00 - 09:30

Session Title
Towards the Holy Grail of Imaging Infection

Chairpersons
Michala Reichkendler (Copenhague, Denmark)
Edel Noriega-Álvarez (Guadalajara, Spain)

Programme

08:00 - 08:25 **Sanjay Jain** (Baltimore, USA): Novel radiotracers for infection imaging

08:25 - 08:50 **Andor W.J.M. Glaudemans** (Groningen, Netherlands): Total body PET: new opportunities for infection imaging

08:50 - 09:10 **Margarita Kirienko** (Milan, Italy): Role of AI in infection and inflammation imaging

09:10 - 09:30 **Martina Sollini** (Milan, Italy): Indications for PET/MRI in infection

Educational Objectives
1. To learn about the latest research and advances in the development of radiotracers for the diagnosis of infections, as well as to evaluate the viability of new radiotracers for their implementation in clinical practice.
2. To identify the advantages and disadvantages of PET/MRI compared to other imaging techniques for the diagnosis of infections.
3. To evaluate the advantages and limitations of Total Body PET compared to traditional PET techniques. Become familiar with the physical principles and design of the Total Body PET scanner.
4. To analyse how AI-based tools can improve the detection sensitivity of molecular imaging in infection and inflammation, but also how AI could push data analysis beyond the current application towards outcome prediction and long-term risk assessment.

Summary
Detection of hidden infections and low-grade inflammation in clinical practice remains a challenge and relies heavily on the expertise of readers. This often causes diagnostic and treatment delays, but also potential untapped areas of application.
The target is to develop radiotracers that can be used to detect and localise infections with molecular imaging scans such as positron emission tomography. It is important to understand the mechanisms of action and properties of new generation radiotracers as well as to identify their advantages and disadvantages.
Whole-body PET allows high-sensitivity imaging with a significantly improved signal-to-noise ratio. These improved performance characteristics allow for reduced PET scan times and 'whole-body' data acquisition, which can be exploited to reduce the amount of radiotracer required, thus allowing more frequent imaging or longer imaging periods during radiotracer decay. New approaches to PET imaging of infectious diseases are emerging, including those that directly visualise pathogens in vivo and characterise concomitant immune responses and inflammation.

Moreover, PET/MR is a constantly evolving technology, and it is important to keep up-to-date with its applications in the diagnosis and treatment of infections in order to improve knowledge, skills and expertise in this field. This will help to provide better patient care and contribute to the advancement of nuclear medicine.
It is also mandatory to explore possible future applications of whole-body PET or PET/MR in infection imaging, including its impact on the diagnosis, treatment and monitoring of different diseases. Moreover, artificial intelligence (AI) offers innovative approaches to exploit the richness of image data and has already led to revolutionary advances in other fields of medicine.

Key Words
Infection and inflammation imaging; PET/MRI; Total body PET; AI