Tentative outline
Special issue for CURRENT ALZHEIMER RESEARCH
Guest Editor: Barbara Palumbo

MOLECULAR IMAGING IN DEMENTIA: FROM THE STATE-OF-THE-ART TO THE NEW PERSPECTIVES

Aims & Scope:
The issue concerns the role of molecular imaging in the diagnosis of Alzheimer’s disease (AD) and other dementia disorders, from the state-of-the art to the new perspectives. Molecular imaging is able to evidence the in vivo distribution of radiocompounds that reflect biochemical and biological processes, thus contributing to the early diagnosis of dementia. In the first part of the issue $^{18}$ Fluoro-deoxy-glucose ($^{18}$FDG) Positron Emission Tomography (PET) and brain single-photon-emission computerized tomography (SPECT) with perfusion radiopharmaceuticals and dopaminergic tracers are described as well-known used tools to investigate the differential diagnosis of dementia disorders (i.e. AD, MCI, FTD, LBD, and parkinsonian syndromes). In the following part new radiopharmaceuticals such as beta-amyloid, tau-protein and alpha-synuclein radiocompounds are also discussed, including the state-of-the art, the radiochemist’s point of view and the new clinical perspectives for the future. These radiocompounds represent the diagnostic new frontier to image AD, as they are disease-specific and clinically promising. Furthermore the actual and future role of PET/MR (in particular with hybrid systems) in dementia is presented, because the fusion of PET and MR images allows the perfect anatomic location of metabolic defects in dementia. Finally, as a further addition to image data elaboration to contribute to the differential diagnosis of dementia, the role of automatic classifiers of brain images (SPECT and PET) by means of artificial intelligence techniques (i.e. support vector machine, artificial neural networks, etc.) is also shown.

Key-words: SPECT, PET, PET/MR, neuroimaging, dementia, Alzheimer’s disease, Parkinson’s disease, lewy body dementia, amyloid radiopharmaceuticals, tau-protein and alpha-synuclein radiocompounds, computer aided diagnosis, artificial intelligence

Tentative title/subtopics:

1. $^{18}$FDG PET in dementia: state of the art and perspectives by Prof. Dr. Rudi Dierckx et al., The Netherlands
2. Brain SPECT with perfusion radiopharmaceuticals and dopaminergic system radiocompounds in dementia disorders by Dr. Susanna Nuvoli, Prof. Dr. Giuseppe Madeddu, Prof. Dr. Angela Spanu et al., Italy
3. PET with beta-amyloid radiopharmaceuticals: present and future” by Prof. Dr. Orazio Schillaci et al., Italy
4. Non-amyloid PET biomarkers for neurodegeneration (including labelled tau, Alpha-synuclein and neuroinflammation) by dr. Ana M. Catafau, et al., Spain
5. Labelled p tau: radiochemist's point of view and clinical data by Prof. Dr. Shozo Furumoto and Prof. Dr. Nobuyuki Okamura, et al., Japan
6. Association of PET with $^{18}$FDG and amyloid radiopharmaceutical to image dementia by Dr. Ryuichi Takahashi and Prof. Dr. Kazunari Ishii, et al. Japan
7. PET/MR imaging in dementia by Mainta I., Perani D, Haller S., Vargas MI, Ratib O, Garibotto V. Switzerland
8. Role of artificial intelligence techniques (automatic classifiers) in molecular imaging modalities in neurodegenerative diseases by Mario Luca Fravolini, Helmut Sinzinger, Orazio Schillaci, Barbara Palumbo, Italy and Austria

**Schedule:**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manuscript submission deadline:</td>
<td>May 20, 2015</td>
</tr>
<tr>
<td>Peer review due:</td>
<td>June 30, 2015</td>
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<tr>
<td>Revision Due:</td>
<td>August 20, 2015</td>
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<tr>
<td>Notification of Acceptance by the Guest Editor:</td>
<td>September 15, 2015</td>
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<tr>
<td>Final manuscript due:</td>
<td>September 30, 2015</td>
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</tbody>
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