Mediterranean Thematic Workshops in Advanced Molecular Imaging

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Euro-BioImaging ERIC: Open access imaging services enable cutting-edge research - an ISIDORe project evaluating COVID-19 effects with mouse brain imaging

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Euro-BioImaging ERIC is a European Research Infrastructure Consortium and an ESFRI Landmark that provides open access to imaging technologies, training, and data services in biological and biomedical imaging. Euro-BioImaging contributes to crucial societal challenges by actively participating in EU-funded projects, such as ISIDORe, to provide the scientific community with access to cutting-edge imaging services and expertise. ISIDORe, Integrated Services for Infectious Disease Outbreak Research, is a Horizon Europe project bringing together 154 service providers to advance research on epidemic-prone diseases.

Within ISIDORe, Euro-BioImaging contributed to an innovative project to create an automated mouse brain alignment tool. The tool was developed at the Euro-BioImaging Nodes in Finland (FiAM and Turku PET Centre) to understand better brain-related disorders that COVID-19 patients can experience - such as headaches, confusion, loss of smell and taste, seizures, and stroke. The study hypothesised that the virus may be able to reach the brain and cause a severe and abrupt infection.

It was crucial to investigate the localised effects of COVID-19 using positron emission tomography (PET) imaging, which allows non-invasive whole-body imaging of metabolic processes, to comprehend better how the coronavirus functions, potentially prevent its actions and possibly treat the infection.

The COVID-19-related inflammatory processes were studied using PET imaging in a mouse model of COVID-19-induced brain damage. In addition to in vivo PET imaging, autoradiography studies were performed to study brain regions that are below the resolution limits of the PET. Usually, these analyses are performed manually, entailing long analysis times, inaccuracies, and high variability. In this case, a customised pipeline for analysis of autoradiographic images was developed to quantify the autoradiography images, greatly enhancing data analysis. This novel approach was made possible through a combination of the Euro-BioImaging user access services and funds from the ISIDORe project.

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Session Classification: Advances in multimodality imaging to increase our understanding of the inflammation's role in healthy and diseased tissue