Imaging in Tissue Engineering

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As the field of regenerative and personalized medicine matures, the need for novel enabling technologies to characterize cells and engineered constructs (i.e. cells/tissue combined with scaffolds and/or growth factors) as well as their individual components in a more insightful, quantitative and preferably non-invasive manner becomes imperative. Multiphoton laser-based imaging and Raman microspectroscopy are an emerging techniques that allow assessing molecular interactions and the biochemical structure of a sample in a non-invasive manner. Specifically for tissue engineering applications, especially Raman microspectroscopy has been proven to allow determining biochemical information on cells, tissues and/or material-cell tissue constructs without the need for labels.
The aim of the presentation is to show the applicability of Multiphoton laser-based imaging and Raman microspectroscopy for regenerative and personalized medicine applications and disease monitoring, and to discuss the added value of the generated data for tissue engineering construct design optimization and preclinical as well as clinical applications.