

A Real Time Live Confocal Look at Human Islet Transplantation: VENI, VIDI, but still no VICI

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Herein we present a method allowing an accurate analysis of islet cell viability in real time which can be applied to cells and tissues *in vitro* as well as *in vivo*. For this purpose we combined the addition of live stains with live confocal microscopy.

Several fluorescent dyes such as, wheat germ agglutinin (WGA), tetramethylrhodamine methyl ester perchlorate (TMRM) and Rhod-2, were used to assess cell morphology (WGA), mitochondrial activity (TMRM) or intracellular calcium content (Rhod-2). Microscopy was performed with a microlens-enhanced Nipkow disk-based system which allows live confocal data acquisition.

A precise and fast assessment of islet cell viability is achievable using the combination of such a live confocal imaging system with the above mentioned fluorescent dyes. The fast data acquisition and the high precision allowing even single organelle visualization in living cells fulfills the requirements for a fast and efficient monitoring of cell quality under different situations *in vitro* as well as *in vivo*.

The result is a new method which is fast, accurate and versatile making it an ideal tool to study islet cell biology under different conditions such as after their isolation, transport, transplantation or their culture. Although insights into all these different conditions of islet cell biology are possible, and in spite of “having seen a lot” we still are learning and did not win the battle in the field of islet transplantation. However, considering the amount of other live stains available, this method can be extended and adapted to assess other vital parameters such as the generation of oxygen radicals. Therefore, we are convinced that real time live confocal imaging will be one of the key methods for a better understanding of islet cell biology, especially in the whole context of islet transplantation.