Using Commercial Oxygen MicroSensors to Measure Oxygen Consumption in Cell Cultures

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There is a need for a clinical alternative for the "gold standard" autograft. An autograft involves harvesting tissue from alternate locations in the body and substituting tissue in lacking areas. The autograft protocol is used to treat tissue/bone injuries, particularly after trauma. Roughly two million autograft procedures take place annually and is a $2.5 billion industry. Autografts are usually poorly integrated, cause patient morbidity, and typically require a second procedures. The tissue engineering/regenerative medicine industry seeks to incorporate more autologous regimens to heal tissue injuries through the stimulation of biological processes and mechanisms. A popular subject the field continually aims to comprehend is the process of bone healing and regeneration. Earlier studies have concluded that cellular responses to mechanical and molecular cues have potential for engineering efficient therapies of musculoskeletal injuries. A more specific aspect of bone healing that must be understood for future solutions is the characterization of the environment in which bone replenishes. The manner healing takes place is a subject tissue engineering approaches aim to manipulate in vitro and in vivo and remains a relatively unanswered question. Developing oxygen sensors would allow for more understanding of bone defect environments. The oxygen measurements were taken using PreSens Microsensors. The microsensor was placed in a 3D designed probe guide, and the sensor was exposed to the gel laded with cells and growth media. Each day throughout the two week experiment, there was trend of oxygen decreasing over time. The trend was more consistent in the static culture as the dynamic culture required more time to reach similar levels of oxygen.

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