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|  |  |  הטכניון - מכון טכנולוגי לישראל TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY  |
| הפקולטה להנדסה כימיתע"ש וולפסון |  |  |
| The Wolfson Department of Chemical Engineering |  |  |

**Wolfson Department of Chemical Engineering Seminar**

**Wednesday, July 21st, 2021, at 13:30**

**Lecture Hall No. 6**

**Bonelike composite scaffolds for vascular bone regeneration**

**Itay Zusmanovitch**

**MSc Seminar**

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Bone tissue engineering is an innovative research field aimed to provide substitution of bone grafts for bone tissue regeneration and recovery. An ideal scaffold for tissue engineering should meet various biophysical requirements including biocompatibility, appropriate mechanical properties, pore size within a certain range, high porosity, bioresorbability, osteoconductivity, and more. Though many technologies have emerged, and improvements have been performed, it is still challenging to provide a satisfying product, mainly due to the reason that optimizing one property (e.g. porosity) can sometimes hamper another (e.g. mechanical performance). A very important and crucial capability of the scaffold, which in many cases is neglected, is supporting angiogenesis and blood vessel penetration for maintaining the viability of the cells and tissue.

Biomimicking the bone tissue structure and composition remain the main approach for fabricating an ideal implantable bone graft scaffold. To answer most of the bone graft's needs, a bonelike composite scaffold was suggested, comprising of outer and inner layers mimicking the cortical and trabecular bone layers respectively. Both layers consist of an interconnected porous collagen-apatite scaffold with suitable pore sizes for vascularization and bone cells in growth. The layers were fabricated using two methods: one by salt leaching of polycaprolactone (PCL) treated to enhance bioactivity, and second by lyophilization of collagen-chitosan-hydroxyapatite suspension.

In this seminar, I will present the progress of the scaffold's fabrication, exhibit physical characterization of both layers, and address the potential application of this scaffold for controlled protein release for vascular bone formation.

**Refreshments will be served at 13:15**