

**LEVELS OF WISTAR CALCIUM SERUM (*Rattus Norvegicus*) IN  
HUMAN ADIPOSE-DERIVED MESENCHYMAL STEM CELLS  
(hADMSCs) AND CHITOSAN SCAFFOLD BY OSTEOINDUCTION  
EXAMINATION**

**ABSTRACT**

**Background:** Bone tissue reconstruction with extensive damage is one of the challenges for dentists because its healing process of bone tissue. Bone graft is the gold standard for bone repair. However, the use of bone graft has a limited amount of tissue produced. Tissue engineering is the latest method in terms of bone regeneration. Tissue engineering has three main components, first is stem cells that have self renewal ability and multilineage differentiation, second is bioreactor / growth factor, and then scaffold. The combination of hADMSC and chitosan scaffold, is expected to trigger osteoinduction shown by osteogenic markers such as calcium levels. **Purpose:** To prove osteoinduction in a combination of Human Adiposed Derived Mesenchymal Stem Cell (hADMSC) and chitosan scaffold using blood serum calcium levels. **Methods:** This study uses 12 treatment groups with each group having 4 samples. Groups 1 to 4 were the negative control group at 1st,3rd,7th, and 14th days which maxillary bone drilling only. While groups 5 to 8 were the positive control group at 1st,3rd,7th, and 14th days which were given chitosan scaffold. Groups 9 to 12 were treatment group at 1st,3rd,7th, and 14th days which were given hADMSC and chitosan scaffold. Blood collection is carried out in each group to check serum calcium levels. **Result:** There were differences in calcium levels in blood serum in each group. **Conclusion:** The application of hADMSC and chitosan scaffold caused a significant change in serum calcium levels on the 1st, 3rd, 7th and 14th days which meant that the combination of hADMSC and chitosan scaffold could trigger osteoinduction.

**Keywords:** Human Adiposed Derived Mesenchymal Stem Cell, chitosan scaffold, tissue engineering, calcium

**KADAR KALSIUM SERUM TIKUS WISTAR (*Rattus Norvegicus*) PADA HUMAN ADIPOSE-DERIVED MESENCHYMAL STEM CELLS (hADMSCs) DAN CHITOSAN SCAFFOLD DENGAN PEMERIKSAAN OSTEOINDUKSI**

**ABSTRAK**

**Latar Belakang:** Rekonstruksi jaringan tulang dengan kerusakan yang luas merupakan salah satu tantangan bagi dokter gigi dalam proses penyembuhan jaringan tulang. *Bone graft* merupakan *gold standard* pada perbaikan tulang. Akan tetapi penggunaan bone graft memiliki keterbatasan jumlah jaringan yang dihasilkan. *Tissue engineering* merupakan metode mutakhir dalam hal regenerasi tulang. prinsip *Tissue engineering* memiliki tiga komponen utama yaitu *stem cell* yang memiliki kemampuan *self renewal* dan diferensiasi *multilineage*, *bioreactor/growth factor*, dan *scaffold*. Penggabungan hADMSC dan *chitosan scaffold*, diharapkan dapat memicu osteoinduksi yang ditunjukkan oleh marker osteogenik seperti kadar kalsium. **Tujuan:** Membuktikan adanya osteoinduksi pada aplikasi *Human Adipose Derived Mesenchymal Stem Cell* (hADMSC) dan *chitosan scaffold* menggunakan kadar kalsium serum. **Metode:** Penelitian ini menggunakan 12 kelompok perlakuan dengan masing masing kelompok terdapat 4 sampel. Kelompok 1 hingga 4 adalah kelompok kontrol negatif hari ke-1,3,7,dan 14 yang hanya dilakukan pengeburan tulang maksila. Sedangkan kelompok 5 hingga 8 adalah kelompok kontrol positif hari ke-1,3,7,dan 14 yang diberi *chitosan scaffold*. Kelompok 9 hingga 12 adalah kelompok perlakuan hari ke-1,3,7,dan 14 yang diberi hADMSC dan *chitosan scaffold*. Pengambilan darah dilakukan pada setiap kelompok untuk memeriksa kadar kalsium serum. **Hasil:** Ada perbedaan kadar kalsium serum pada setiap kelompok. **Kesimpulan:** Aplikasi hADMSC dan *chitosan scaffold* menyebabkan perubahan yang signifikan pada kadar kalsium serum pada hari ke-1, ke-3, ke-7 dan ke-14 yang berarti hADMSC dan *chitosan scaffold* dapat memicu osteoinduksi.

**Kata kunci:** *Human Adipose-Derived Mesenchymal Stem Cells*, *chitosan scaffold*, *tissue engineering*, kalsium.