Effects of LASER treated titanium surfaces on osteogenesis in vitro

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Resumo:
Since surface treatments can modify titanium topography and enhance osseointegration, the aim of the present investigation was to evaluate differentiation and activity of pre-osteoblastic cells grown on machined commercially pure titanium discs modified by pulsed Yb:YAG LASER (Ytterbium:Yttrium Aluminium Garnet Light Amplification by Stimulated Emission of Radiation) beam. For this purpose, MC3T3-E1 cells were plated on Machined (MS) or LASER treated (LS) surfaces at a density of 2x10⁴ cells/disc and cultured for up to 21 days. The following parameters were assayed: 1) cell morphology (at 3, 7 and 12 days), 2) cell viability/proliferation (at 3, 7, 12 and 21 days), 3) alkaline phosphatase activity (at 3, 7, 12 and 21 days), 4) bone sialoprotein immunolocalization (at 21 days) and 5) matrix mineralization (at 21 days). The results indicated no differences between MS and LS for all parameters assayed; both surfaces supported osteoblast differentiation. In conclusion, LASER treated titanium surfaces did not improve osteogenesis in vitro. However, it is reasonable to consider that these findings may contribute to a better understanding of the effects of LASER surface modification on osseointegration in animal models.