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Steroid-harboring nanoparticles provide anti-inflammatory response with less adverse effects

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Statement of the Problem: Steroids are acknowledged anti-inflammatory drugs used in multiple conditions, including autoimmune disease. Steroids provide strong suppression of inflammation; however, their long-term utilization triggers numerous adverse effects including obesity, diabetes, osteoporosis, edema retention etc. As a result, only inflammatory flares are treated with steroid compounds, for short term.

Methodology & Theoretical Orientation: Our collaborative research team has produced nanoparticles of specific size harboring steroid compounds. In theory, due to their specific size steroid-harboring nanoparticles trigger phagocytosis in monocytes and macrophages, but leave other (non-phagocytic) cells unaltered.

Findings: Our human *in vitro* data indicate that steroid particles show potent anti-inflammatory effect on monocytes/macrophages, equivalent to that of steroid solution. However, their adverse effects are reduced using non-phagocytic cells. Liver cells, for example, show increased viability with steroid particles as opposed to steroid solution.

Conclusion & Significance: Our working hypothesis was that steroid-particles of a specific size range can preferentially target monocytes/macrophages, the major mediators of inflammation. Other (non-phagocytic) cell types shall largely be unaltered by steroid particles, as opposed to steroid solution. This is confirmed by our data. Our technology allows for the production of regular steroid compounds with significantly reduced side effects, with the promise of long-term use in human.

Biography

Krisztian Kvell has expertise in Immunology and Biotechnology. He works in the field of Immune Senescence and its relation to steroid compounds. Currently, he is working in Department of Pharmaceutical Biotechnology, Faculty of Pharmacy, at University of Pecs, Hungary. He is currently involved in interdisciplinary research utilizing steroid compounds and nanoparticles. This field has encouraged the collaborative research team to develop novel drug delivery strategies of steroid treatment, to allow for targeted steroid treatment with potent anti-inflammatory effect with reduced level side effects.

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