Investigating the Anti-Inflammatory Effects of NestaCell® in an AIRmax Murine Model of Acute Inflammatory Response

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Introdução: A inflamação é uma resposta biológica a interrupções na homeostase do tecido, frequentemente desencadeada por lesão tecidual de patógenos, agentes físicos ou químicos, reações imunológicas ou necrose. A inflamação aguda é caracterizada por um rápido influxo de leucócitos e proteínas plasmáticas para o local da lesão, acompanhado por aumento da permeabilidade vascular que facilita a migração de células imunes e a liberação de mediadores inflamatórios. As células-tronco mesenquimais (CTM) podem migrar para o local da inflamação por meio de sinais de quimiocina, um processo conhecido como homing. Os fatores parácrinos secretados pelas CTMs criam um microambiente protetor, auxiliando na regeneração do tecido e restaurando a homeostase. Assim, as CTMs não apenas migram para locais inflamatórios, mas também exercem ativamente efeitos anti-inflamatórios, destacando seu potencial como imunomoduladores em aplicações terapêuticas que visam a inflamação. Neste estudo, células-tronco imaturas da polpa dentária humana (CTPDh), um subtipo exclusivo de MSCs derivadas da origem da crista neural, foram utilizadas por suas características distintas e potencial terapêutico.

Objetivos: O objetivo deste estudo é avaliar o potencial imunomodulatório de células-tronco de polpa dentária humana (CTPDh) na quinta passagem, que corresponde ao componente ativo do produto NestaCell® em modelo murino geneticamente selecionado para reatividade inflamatória aguda máxima(AIRmax).

Materiais e métodos: Utilizando um modelo animal para inflamação, modelo murino AIRmax, a inflamação aguda foi induzida usando uma suspensão de 750 µL de Biogel P100. Duas horas após a indução, 100 µL de uma suspensão de células contendo 1×10^6 do produto NestaCell® foram administrados por injeção

no plexo venoso retro-orbital. Após um tratamento de 24 horas com NestaCell®, o exsudato foi coletado e aliquotado para medição subsequente dos níveis de proteína e citocina. (CEUA nº 6597290524)

Resultados e Conclusão: Os resultados indicam que o tratamento com NestaCell® nos camundongos AIRmax pode produzir efeitos anti-inflamatórios significativos. Isso é evidenciado por uma produção reduzida de citocinas no exsudato inflamatório, migração diminuída de leucócitos e produção de espécies reativas de oxigênio, com diferenças estatisticamente significativas entre os grupos de tratamento e controle. Esses resultados destacam o potencial do NestaCell® como um agente terapêutico para modular respostas inflamatórias, necessitando de maior exploração de seus mecanismos de ação e aplicabilidade clínica em condições inflamatórias.

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