Determining the Immunological Properties of Oral Mucosa Lamina Propria Progenitor Cells

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Introduction

The oral mucosa is distinct from skin in that it repairs defects with little/no scar formation, suggesting similarities with the regenerative capacities of the foetus. We have previously demonstrated that a progenitor cell (PC) population resides within the oral mucosal lamina propria (OMLP) and that these PCs are capable of generating cells of mesenchymal and neuronal lineages for tissue engineering¹. Emerging evidence suggests that some mesenchymal stem cell (MSC) sources may be useful in the treatment of inflammatory diseases, in addition to tissue engineering applications, due to their immunosuppressive properties. This study aims to determine the immunological properties of OMLP PCs and their potential for use in allogeneic tissue engineering and in the treatment of immune related disorders.

Materials and Methods

Previously established clonal populations of OMLP PCs (n=3) were expanded in monolayer culture for subsequent experiments. All assays were carried out in the presence/absence of 100U/ml Interferon γ (IFNγ). Expression of Human Leukocyte Antigen (HLA) class I and II on the cell surface and intracellularly were determined by FACS and Western Blotting. Mixed lymphocyte cultures (MLC) were performed in the presence/absence of the T cell mitogen, phytohaemagglutinin (PHA), and in both contact and transwell culture systems. Data was statistically analysed by ANOVA and a Bonferroni Post-hoc test. Significance was assumed at P<0.05.

Results

FACS analysis confirmed that HLA I is constitutively expressed on OMLP PCs. Intracellular expression of HLA II was inducible after 24 hours of treatment with IFNγ, however, cell surface expression was not detectable until 7 days of IFNγ treatment. MLCs confirmed that OMLP PCs potently suppress lymphocyte proliferation in vitro in a concentration independent manner (P<0.001 compared to controls; fig. 1) and that the mechanism of immunosuppression was HLA II independent. Transwell cultures confirmed that this mechanism of immunosuppression was also contact independent (P<0.001 compared to controls).

Discussion and Conclusions

This study demonstrates the potent immunosuppressive capabilities of OMLP PCs on lymphocyte proliferation in vitro. We have determined that OMLP PCs suppress lymphocyte proliferation in both a concentration and contact independent manner, suggesting that OMLP PCs may be ideal candidates for allogeneic tissue engineering due to their immunosuppressive properties. These data also demonstrate the potential of OMLP PCs for use in the treatment of immune-related disorders such as Graft-Versus-Host-Disease, where MSCs are already being utilised.

References

1. Davies LC et al. Stem Cells Dev. 19(6) 2010

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Disclosures

The authors have nothing to declare.