DEVELOPMENT OF AN ORAL CANCER ORGANOTYPIC CELL CULTURE FOR DRUG SCREENING

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Development of new therapies is important to all fields of health sciences. However, drugs tests are usually done in monolayer cell culture that does not represent the same cytotoxic and effective effects seen in vivo conditions. The main problem of in vivo models is that animal and human trials have a high biological, ethical and financial cost. Therefore, there is a need to develop in vitro models that better represent human tissues in order to increase the number of drugs with real potential to be translated to the clinical scenario. To reach this approach, the aim of this study is to develop an organotypic cell culture of oral cancer and compare the use of different cell lines to reach this approach.

It was used collagen I extracted from rat tails to produce the extracellular matrix. Then, primary fibroblasts were added to the extracellular matrix and incubated for 3 days. On top of the matrix, different cell lines with epithelial origin were used to compare how they behave in a 3D model. It was used a keratinocyte cell line (HaCat), a low invasive oral cancer cell line (Cal27) and an invasive oral cancer cell line (SCC-9). After these cells attached to the collagen gel, the 3D matrix was lifted to an air-liquid interface to allow epithelium stratification. Then, this structure was cultured for 14 days and fixed on paraformaldehyde 4%. The obtained tissue was processed, paraffin-embedded, sectioned and stained with haematoxylin and eosin. The keratinocyte and the low invasive oral cancer cell lines formed a disorganized epithelium with multiple cell layers. However, the stratification did not follow human epithelium stratification in vivo. Only the invasive oral cancer cell showed invasion into the adjacent tissue and resembled oral cancer architecture as we observe in human specimens. In conclusion, we were able to form a stratified epithelium and an oral cancer in vitro. There is still a need to try this same methodology with primary cells since literature has shown that they form an epithelium structure more similar to what we have in vivo. Our perspective is to test this model for drug screening and evaluate its effectiveness.