COMPARATIVE EVALUATION OF CELL ADHESION AND PROLIFERATION ON SURFACE TREATED TITANIUM DISCS WITH A Ch-Mr-Tr HYDROGEL"-AN IN VITRO STUDY

Adarsh Varma R, Santosh Y Nelogi

Abstract

Implant placement is guarded and guided by multiple factors like the bone quality, quantity and as well is attributed to implant surface behaviour. Most implant surface treatments aims at enhancing the activity of bone-forming cells and its mediators to increase new bone formation thereby promoting better bone to implant intimate contact and improving the prognosis of the treatment. Keeping up with these concepts;this study aims to modify the implant surface simulated in form of Ti disc treated with a novel hydrogel which is a combination of **CHITOSAN-MORINGA OLEIFERA AND TRIGONELLA FOENUM-GRACUM(Ch-Mr-Tr)**

Moringa seed extract powder

Trigonella leaf extracts

Formulations on Ti discs in the micro well titre plate.

Results

Acridine Orange Staining

Von Kossa's staining for quantification of mineralization

SEM images

Background and Aim

- Inadequate bone to implant contact and increased time for osseointegration being a major concern in implant based rehabilitation many efforts were made to increase the proliferation of osteoblasts and matrix laying down potential. In this study we modify the surface of implants through an organic coating in the form of **CHITOSAN-MORINGA OLEIFERA-TRIGONELLA** hydrogel, proliferating osteoblasts so as to achieve an intimate bone-implant contact.
- The aim of this study is to evaluate and compare proliferation of MG-63 osteoblast like cells in response to **chitosan-moringa-trigonella** hydrogels on titanium discs.

Conclusion

- The novel technique with surface treated Ti can efficiently enhance osteoblast seeding and migration onto the surface of the implant and increase subsequent cell-cell interactions and shorten the period of cell proliferation.
- This novel surface treatment is thought to be useful in the development of biological seal around the implant and thereby aiding in the repair or replacement of tissues to achieve better bone to implant contact.

Methods and Materials

- Preparation of Ch-Moringa(Mr): CH (3gm in 100 ml) was dissolved in diluted acetic acid and a pH was adjusted to neutral using 0.1 N NaOH. Mr was added with constant stirring.
- Ch-Trigonella(Tr) preparation: Tr Extract was prepared with 99.5% ethanol by maceration technique (100gm powder in 500ml). The pure extract obtained was incorporated into CH.
- (Ch-Mr-Tr) was prepared by mixing both the above mentioned in 50:50 by weight. Influence on human osteoblast like cell(MG63) was assessed in terms of cell adhesion/viability. The cell viability was measured using MTT assay and. Matrix mineralization was assessed by von Kossa's staining and morphology of the cells were assessed by scanning electron microscope.

References

- Fernandes EE, Pulwale AV, Patil GA, Moghe AS. Probing regenerative potential of Moringa oleifera aqueous extracts using in vitro cellular assays. Pharmacognosy research. 2016 Oct;8(4):231.
- Premanath R, Sudisha J, Lakshmi Devi N, Aradhya SM. Antibacterial and anti-oxidant activities of fenugreek (Trigonella foenum graecum L.) leaves. Journal Medicinal Plants Resereach. 2011;5(6):695-705.
- Fakhry A, Schneider GB, Zaharias R, Şenel S. Chitosan supports the initial attachment and spreading of osteoblasts preferentially over fibroblasts. Biomaterials. 2004 May 1;25(11):2075.