

P53 and VEGF expression in human temporomandibular joint discs with internal derangement correlate with degeneration

Claudia Lombardo¹, Rosalia Leonardi², Paola Castrogiovanni¹, Giuseppe Musumeci¹, Luis Eduardo Almeida³, Sergio Castorina¹

¹ Department of Biomedical and Biotechnological Sciences, Section of Anatomy and Histology, University of Catania, Italy

² Department of General Surgery and Medical-Surgical Specialties, University of Catania, Italy

³ Department of Surgical Sciences, Oral surgery, Marquette University School of Dentistry, Milwaukee, Wisconsin, USA

Aim: Temporomandibular joint (TMJ) disorders are one of the most relevant causes of chronic facial pain and disability. During histopathological conditions biomolecular mechanisms occur inducing histologic changes of the tissue itself. Human Tumor Protein p53 and Vascular Endothelial Growth Factor are related with cell-cycle control, angiogenesis and both play a central role during inflammation. The purpose of the present research was to investigate the immunoexpression and immunolocalization of Human Tumor Protein p53 and Vascular Endothelial Growth Factor in temporomandibular joint discs of individuals with internal derangement with anterior disc displacement in order to gain insights into the apoptotic and angiogenetic processes in the three bands of articular discs with or without reduction and compare them to the histological degeneration score.

Methods: Paraffin samples of eighteen displaced temporomandibular joint and four control discs were analyzed by immunohistochemistry for the above evaluations.

Results: Data showed a strong Human Tumor Protein p53 and Vascular Endothelial Growth Factor immunoexpression in the anterior and intermediate disc areas and a weak immunoexpression in posterior area of anterior disc displacement with reduction patients while anterior disc displacement without reduction patients demonstrated a weak Human Tumor Protein p53 and Vascular Endothelial Growth Factor immunolabelling in the anterior and intermediate areas and a strong immunoexpression in posterior band. These immunoexpressions correlated with histological degeneration score.

Conclusions: According to our results it can be assumed in that when the more histopathological changes in the disc are revealed, major levels of p53 and VEGF are produced.

References

- [1] X.W. Liu, J. Kang, X.D. Fan, L.F. Sun, Expression and significance of VEGF and p53 in rat degenerated intervertebral disc tissues. *Asian. Pac. J. Trop. Med.* 6 (5) (2013) 404-406.
- [2] S. Zhang, W. Cao, K. Wei, X. Liu, Y. Xu, C. Yang, G. Undt, M.S. Haddad, W.Chen, Expression of VEGF-receptors in TMJ synovium of rabbits with experimentally induced internal derangement. *Br. J. Oral. Maxillofac. Surg.* 51(1) (2013) 69-73.
- [3] H.C. Reinhardt, B. Schumacher, The p53 network: cellular and systemic DNA damage responses in aging and cancer. *Trends. Genet.* 28 (3) (2012) 128-136.
- [4] D. Speidel, Transcription-independent p53 apoptosis: an alternative route to death. *Trends Cell. Biol.* 20 (1) (2010) 14-24.
- [5] R. Leonardi, M.C. Rusu, C. Loreto, Temporomandibular joint disc: a proposed histopathological degeneration grading score system. *Histol. Histopathol.* 25 (9) (2010) 1117-1122.
- [6] Leonardi R, Loreto C, Barbato E, Caltabiano R, Lombardo C, Musumeci G, Lo Muzio L. MMP-13 (collagenase 3) localization in human temporomandibular joint discs with internal derangement. *Acta Histochem.* 2008;110(4):314-8.
- [7] R. Leonardi, L. Lo Muzio, G. Bernasconi, C. Caltabiano, C. Piacentini, M. Caltabiano, Expression of vascular endothelial growth factor in human dysfunctional temporomandibular joint discs. *Arch. Oral. Biol.* 48(3) (2003) 185-192.
- [8] R. Leonardi, L. Villari, G. Bernasconi, M. Caltabiano, Histochemical study of the elastic fibers in pathologic human temporomandibular joint discs. *J. Oral. Maxillofac. Surg.* 59 (10) (2001) 1186-1192.
- [9] D. Eberhard, H.P. Bantleon, W. Steger, Functional magnetic resonance imaging of temporomandibular joint disorders. *Eur. J. Orthod.* 22 (5) (2000) 489-497.

Keywords