

# **IMMUNOHISTOCHEMICAL DETECTION OF LAMININ-1 AND Ki-67 IN RADICULAR CYSTS AND KERATOCYSTIC ODONTOGENIC TUMORS**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

يَرْفَعُ اللَّهُ الَّذِينَ ءَامَنُوا مِنْكُمْ  
وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ

المجادلة ١١

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## **List of Abbreviations**

**AgNORs:** Antigen nucleolar organizing regions

**BM:** Basement membrane

**CF:** Cystic fluid

**DAB:** Diaminobenzidine

**ECM:** Extracellular matrix

**EGF:** Epidermal growth factor

**EGFr:** Epithelial growth factor receptor

**GM-CSF:** Granulocyte-macrophage colony stimulating factor

**IgA:** Immunoglobulin-A

**IgG:** Immunoglobulin-G

**IL-1:** Interleukin-1

**IL-6:** Interleukin-6

**KCOT:** Keratocystic odontogenic tumor

**LPs:** Lipopolysaccharides

**MMPs:** Matrix metalloproteinases

**NBCS:** Nevoid basal cell carcinoma syndrome

**NK:** Natural killer cells

**NSOKC:** non-syndrome-associated Odontogenic keratocyst

**OKC:** Odontogenic keratocyst

**PBS:** Phosphate buffer saline

**PCNA:** Proliferating cell nuclear antigen

**PGE2:** Prostaglandin E2

**RC:** Radicular cyst

**RRC:** Residual radicular cyst

**SOKC:** Syndrome-associated Odontogenic keratocyst

**SPSS:** Statistical package for scientific studies

**ssDNA:** Single-stranded DNA

**SUPs:** Tissue culture supernatant

**TNF- $\alpha$ :** Tumor necrosis factor-alpha



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**INTRODUCTION  
AND  
REVIEW OF  
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## Introduction and Review of Literature

Odontogenic cysts are those which arise from the epithelium associated with the development of teeth. The source of the epithelium is from the enamel organ, the reduced dental epithelium, epithelial rests of Malassez or the remnants of the dental lamina. Cysts are formed either in bone or soft tissue. Some cysts were found to have characteristic features that make them distinct from other lesions <sup>(1)</sup>.

Radicular cysts (RCs) arise from the epithelial residues (rests of Malassez) in the periodontal ligament as a consequence of inflammation which usually follows the death of a dental pulp. They represent more than half of all odontogenic cysts <sup>(2)</sup>. Residual Radicular Cysts (RRCs) persist after removal of teeth affected by RCs. Activation and proliferation of Malassez epithelial rests and lining epithelium of RCs or RRCs are related to inflammatory processes <sup>(3)</sup>. RCs are characterized by a cavity lined by nonkeratinized squamous epithelium of variable thickness. These cysts are typically inflamed and, when inflammation is intense, it may destroy part of the epithelium leaving a zone of granulation tissue in its place <sup>(4)</sup>.

The term “odontogenic keratocyst” was introduced in 1956 by **Philipsen**. In 1962 **Pindborg, Philipsen and Henriksen** established the following histopathologic criteria for

this lesion: (1) the lining epithelium is usually thin and uniform in thickness with little or no evidence of rete ridges (2) there is a well defined basal cell layer, the component cells of which are cuboidal or columnar in shape and often their nuclei are arranged in a palisaded arrangement (3) there is a thin spinous cell layer which often shows a direct transition from the basal cell layer (4) the cells of the spinous cell layer frequently exhibit intracellular edema (5) keratinization is predominantly parakeratotic, but it may be orthokeratotic (6) the keratin layer is often corrugated and (7) the fibrous cyst wall is generally thin and usually uninfamed <sup>(5)</sup>.

Laminins are a family of glycoproteins that are an integral part of the structural scaffolding in almost every animal tissue. Laminins are secreted and incorporated into cell-associated extracellular matrices. Laminin is the major non-collagenous component of the basal lamina. It also has four arms that can bind to four other molecules. Laminin-1 is a major component of most basal laminae. It is a ligand for alpha 2 beta 1 integrin receptor. It plays an essential role in the assembly of basal laminae, as well as in the adhesion of cells to basal lamina <sup>(6)</sup>.

Ki-67 antigen is the prototypic cell cycle related nuclear protein, expressed by proliferating cells in all phases of the active cell cycle (G1, S, G2 and M phase) and reaches a peak in the G2 and M phases. It is rapidly degraded after mitosis with a half life of detectable antigen being an hour or less. It is