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The role of Candida albicans candidalysin ECE1 gene in oral carcinogenesis

(Article in press)

Engku Nasrullah Satiman, E.A.F.[a,b], Ahmad, H.[a,b], Ramzi, A.B.[b], Abdul Wahab, R.[a], Kaderi, M.A.[a], Wan Harun, W.H.A.[c], Dashper, S.[d], McCullough, M.[d], Arzmi, M.H.[e]

[a]Department of Biomedical Science, Kulliyyah of Allied Health Sciences, International Islamic University Malaysia, Kuantan, Malaysia
[b]Institute of Systems Biology (INBIOSIS), Universiti Kebangsaan Malaysia, Bangi, Malaysia
[c]Department of Oral and Craniofacial Sciences, Faculty of Dentistry, University of Malaya, Kuala Lumpur, Malaysia

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Abstract

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Oral squamous cell carcinoma is associated with many known risk factors including tobacco smoking, chronic alcoholism, poor oral hygiene, unhealthy dietary habits and microbial infection. Previous studies have highlighted Candida albicans host tissue infection as a risk factor in the initiation and progression of oral cancer. C albicans invasion induces several cancerous hallmarks, such as activation of proto-oncogenes, induction of DNA damage and overexpression of inflammatory signalling pathways. However, the molecular mechanisms behind these responses remain unclear. A recently discovered fungal toxin peptide, candidalysin, has been reported as an essential molecule in epithelial damage and host recognition of C albicans infection. Candidalysin has a clear role in inflammasome activation and induction of cell damage. Several inflammatory molecules such as IL-6, IL-17, NLRP3 and GM-CSF have been linked to carcinogenesis. Candidalysin is encoded by the ECE1 gene, which has been linked to virulence factors of C albicans such as adhesion, biofilm formation and filamentation properties. This review discusses the recent epidemiological burden of oral cancer and highlights the significance of the ECE1 gene and the ECE1 protein breakdown product, candidalysin in oral malignancy. The immunological and molecular mechanisms behind oral malignancy induced by inflammation and the role of the toxic fungal peptide candidalysin in oral carcinogenesis are explored. With increasing evidence associating C albicans with oral carcinoma, identifying the possible fungal pathogenicity factors including the role of candidalysin can assist in efforts to understand the link between C albicans infection and carcinogenesis, and pave the way for research into therapeutic potentials. © 2020 John Wiley & Sons A/S. Published by John Wiley & Sons Ltd

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