

# Assessing the Carcinogenic Potential of Non-*Candida albicans* in Cancer Therapy-induced Oral Mucositis

<sup>1</sup>A Thirumal Raj, <sup>2</sup>Shankargouda Patil, <sup>3</sup>Kamran H Awan

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Established risk factors for oral cancer including tobacco (smoking, chewing), alcohol, etc., have shown to cause an increase in the salivary acetaldehyde (ACH) levels.<sup>1</sup> The ACH has shown carcinogenic potential in animal models and the International Agency for the Research on Cancer considers ACH to be a possible carcinogen in humans.<sup>2</sup> The ACH can cause mutagenic deoxyribonucleic acid adduct formations at levels > 40 μM.<sup>3,4</sup> Studies have shown the ability of several microorganisms to increase ACH to carcinogenic levels in saliva. The most extensively studied organism is *Candida albicans*. Although the mere presence of *C. albicans* does not indicate a high-risk state, the ACH salivary levels of patients with chronic candidal infections could be a risk factor for oral cancer.<sup>5</sup> *In vitro* studies have shown that even non-*C. albicans* species can form carcinogenic ACH levels in saliva. *Candida glabrata* and *Candida tropicalis* were shown to be the most potential carcinogenic non-*C. albicans* species for their ability

to form carcinogenic levels of ACH from glucose and ethanol respectively.<sup>1</sup> Patients treated for oral cancer are prone to develop oral candidal mucositis due to change in the tissue microenvironment. These patients are often treated with azoles which eliminate *C. albicans*, but are largely ineffective against azole-resistant non-*C. albicans* species. Such patients have shown to develop new primary carcinoma in areas of chronic oral candidal mucositis.<sup>1,6</sup>

To conclude, it is of utmost importance that treatment-resistant chronic oral candidal mucositis especially in susceptible patients (postchemo and radiotherapy) is closely followed up and periodically analyzed for salivary ACH levels. Further large-scale multicenter prospective studies are necessary to substantiate the results from the *in vitro* studies.

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<sup>1</sup>Department of Oral Pathology and Microbiology, Sri Venkateswara Dental College and Hospital, Chennai, Tamil Nadu, India

<sup>2</sup>Department of Maxillofacial Surgery and Diagnostic Sciences College of Dentistry, Jazan University, Jazan, Kingdom of Saudi Arabia

<sup>3</sup>Department of Oral Medicine, College of Dental Medicine Roseman University of Health Sciences, South Jordan, Utah United States of America

**Corresponding Author:** A Thirumal Raj, Department of Oral Pathology and Microbiology, Sri Venkateswara Dental College and Hospital, Chennai, Tamil Nadu, India, Phone: +918122627810, e-mail: thirumalraj666@gmail.com