

 Look Up Full Text

 Find PDF

Full Text Options

 Export...

Add to Marked List


1 of 1

The role of *Candida albicans* candidalysin ECE1 gene in oral carcinogenesis

By: Satiman, EAFEN (Satiman, Engku Anis Fariha Enguku Nasrullah)^[1,2]; Ahmad, H (Ahmad, Hasna)^[1,2]; Ramzi, AB (Ramzi, Ahmad Bazli)^[2]; Wahab, RA (Wahab, Ridhwan Abdul)^[1]; Kaderi, MA (Kaderi, Mohd Arifin)^[1]; Harun, WHAW (Harun, Wan Himratul Aznita Wan)^[3]; Dashper, S (Dashper, Stuart)^[4]; McCullough, M (McCullough, Michael)^[4]; Arzmi, MH (Arzmi, Mohd Hafiz)^[5]

[View Web of Science ResearcherID and ORCID](#)
JOURNAL OF ORAL PATHOLOGY & MEDICINE

DOI: 10.1111/jop.13014

 Early Access: APR 2020

Document Type: Review; Early Access

[View Journal Impact](#)

Abstract

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.

Keywords

Author Keywords: *Candida albicans*; candidalysin; ECE1 protein; immunomodulation

KeyWords Plus: SQUAMOUS-CELL CARCINOMA; CANCER PATIENTS; IMMUNITY; RISK

Author Information

Reprint Address: Arzmi, MH (corresponding author)

+ Int Islamic Univ Malaysia, Kulliyyah Dent, Kuantan Campus, Kuantan 25200, Pahang, Malaysia.

Addresses:

+ [1] Int Islamic Univ Malaysia, Kulliyyah Allied Hlth Sci, Dept Biomed Sci, Kuantan, Malaysia

+ [2] Univ Kebangsaan Malaysia, Inst Syst Biol INBIOSIS, Bangi, Malaysia

+ [3] Univ Malaya, Dept Oral & Craniofacial Sci, Fac Dent, Kuala Lumpur, Malaysia

+ [4] Univ Melbourne, Melbourne Dent Sch, Melbourne, Vic, Australia

+ [5] Int Islamic Univ Malaysia, Kulliyyah Dent, Dept Fundamental Dent & Med Sci, Kuantan, Malaysia

E-mail Addresses: hafizarzmi@iiu.edu.my

Funding

| Funding Agency | Show details | Grant Number |
|---------------------------------|--------------|-----------------------------|
| Ministry of Education, Malaysia | | FRGS/1/2018/SKK11/UIAM/03/1 |

[View funding text](#)

Citation Network

In Web of Science Core Collection

0

Times Cited

 Create Citation Alert

50

Cited References

[View Related Records](#)

Use in Web of Science

Web of Science Usage Count

3

Last 180 Days

3

Since 2013

[Learn more](#)

This record is from:

Web of Science Core Collection

- Science Citation Index Expanded

Suggest a correction

If you would like to improve the quality of the data in this record, please suggest a correction.

Publisher

WILEY, 111 RIVER ST, HOBOKEN 07030-5774, NJ USA

Journal InformationImpact Factor: [Journal Citation Reports](#)**Categories / Classification**

Research Areas: Dentistry, Oral Surgery & Medicine; Pathology

Web of Science Categories: Dentistry, Oral Surgery & Medicine; Pathology

See more data fields

◀ 1 of 1 ▶

Cited References: 50Showing 30 of 50 [View All in Cited References page](#)*(from Web of Science Core Collection)*

1. **Leuloplakia - Review of A Potentially Malignant Disorder** Times Cited: 9
By: Abidullah, Mohammed; Kiran, G.; Gaddikeri, Kavitha; et al.
JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH Volume: 8 Issue: 8 Pages: ZE1-ZE4 Published: AUG 2014
2. **Oral Candida colonization in oral cancer patients and its relationship with traditional risk factors of oral cancer: A matched case-control study** Times Cited: 35
By: Alnuaimi, Ali D.; Wiesenfeld, David; O'Brien-Simpson, Neil M.; et al.
ORAL ONCOLOGY Volume: 51 Issue: 2 Pages: 139-145 Published: FEB 2015
3. **Recent advances in understanding Candida albicans hyphal growth** Times Cited: 1
By: Arkowitz, RA; Bassilana, M.
F1000Research Volume: 8 Pages: 700 Published: 2019
4. **Monospecies and polymicrobial biofilms differentially regulate the phenotype of genotype-specific oral cancer cells** Times Cited: 2
By: Arzmi, Mohd Hafiz; Cirillo, Nicola; Lenzo, Jason C.; et al.
CARCINOGENESIS Volume: 40 Issue: 1 Pages: 184-193 Published: JAN 2019
5. **Candidal Species Identification in Malignant and Potentially Malignant Oral Lesions with Antifungal Resistance Patterns** Times Cited: 2
By: Bansal, Rahul; Pallagatti, Shambulingappa; Sheikh, Sohey; et al.
CONTEMPORARY CLINICAL DENTISTRY Volume: 9 Supplement: 2 Pages: S309-S313 Published: SEP 2018
6. **Analysis of oral yeast microflora in patients with oral squamous cell carcinoma** Times Cited: 4
By: Berkovits, Csaba; Toth, Adel; Szenzenstein, Judit; et al.
SPRINGERPLUS Volume: 5 Article Number: 1257 Published: AUG 4 2016
7. **Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries** Times Cited: 10,289
By: Bray, Freddie; Ferlay, Jacques; Soerjomataram, Isabelle; et al.
CA-A CANCER JOURNAL FOR CLINICIANS Volume: 68 Issue: 6 Pages: 394-424 Published: NOV-DEC 2018
8. **The prevalence rate of periodontal pathogens and its association with oral squamous cell carcinoma** Times Cited: 10
By: Chang, Chunrong; Geng, Fengxue; Shi, Xiaoting; et al.
APPLIED MICROBIOLOGY AND BIOTECHNOLOGY Volume: 103 Issue: 3 Pages: 1393-1404 Published: FEB 2019
9. **Network analysis of hyphae forming proteins in Candida albicans identifies important proteins responsible for pathovirulence in the organism** Times Cited: 2
By: Das, Sanjib; Bhuyan, Rajabrata; Bagchi, Angshuman; et al.
HELIYON Volume: 5 Issue: 6 Article Number: e01916 Published: JUN 2019
10. **Oral and pharyngeal cancer in Europe: incidence, mortality and trends as presented to the Global Oral Cancer Forum** Times Cited: 1
By: Diz, P; Meleti, M; Diniz-Freitas, M.
Transl Res Oral Oncol Volume: 2 Other: 2057178 X17701517 Published: 2017
11. **CARD9(+) microglia promote antifungal immunity via IL-1 beta- and CXCL1-mediated neutrophil recruitment** Times Cited: 19
By: Drummond, Rebecca A.; Swamydas, Muthulekha; Oikonomou, Vasileios; et al.
NATURE IMMUNOLOGY Volume: 20 Issue: 5 Pages: 559-+ Published: MAY 2019