

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More... >](#)[Full Text](#) [View at Publisher](#)

Carcinogenesis

Volume 40, Issue 1, 12 March 2019, Pages 184-193

Monospecies and polymicrobial biofilms differentially regulate the phenotype of genotype-specific oral cancer cells (Article)

Arzmi, M.H.^{a,b}, Cirillo, N.^a, Lenzo, J.C.^a, Catmull, D.V.^a, O'Brien-Simpson, N.^a, Reynolds, E.C.^a, Dashper, S.^a [✉](#), McCullough, M.^a [✉](#) [👤](#)^aOral Health Cooperative Research Centre, Melbourne Dental School, University of Melbourne, Carlton, VIC, Australia^bDepartment of Fundamental Dental and Medical Sciences, Kulliyah of Dentistry, International Islamic University Malaysia, Kuantan, Pahang, Malaysia

Abstract

[View references \(47\)](#)

Microbial infection has been shown to involve in oral carcinogenesis; however, the underlying mechanisms remain poorly understood. The present study aimed to characterize the growth of oral microorganisms as both monospecies and polymicrobial biofilms and determine the effects of their products on oral keratinocytes. *Candida albicans* (ALC3), *Actinomyces naeslundii* (AN) and *Streptococcus mutans* (SM) biofilms or a combination of these (TRI) were grown in flow- cell system for 24 h. The biofilms were subjected to fluorescent in situ hybridization using species-specific probes and analysed using confocal laser scanning microscopy. The effluent derived from each biofilm was collected and incubated with malignant (H357) and normal (OKF6) oral keratinocytes to assess extracellular matrix adhesion, epithelial-mesenchymal transition (EMT) and cytokines expression. Incubation of OKF6 with ALC3 and TRI effluent significantly decreased adhesion of the oral keratinocyte to collagen I, whereas incubation of H357 with similar effluent increased adhesion of the oral keratinocyte to laminin I, significantly when compared with incubation with artificial saliva containing serum-free medium (NE; $P < 0.05$). In OKF6, changes in E-cadherin and vimentin expression were not consistent with EMT although there was evidence of a mesenchymal to epithelial transition in malignant oral keratinocytes incubated with AN and SM effluent. A significant increase of pro-inflammatory cytokines expression, particularly interleukin (IL)-6 and IL-8, was observed when H357 was incubated with all biofilm effluents after 2- A nd 24-h incubation when compared with NE ($P < 0.05$). In conclusion, *C.albicans*, *A.naeslundii* and *S.mutans* form polymicrobial biofilms which differentially modulate malignant phenotype of oral keratinocytes. © 2018 The Author(s). Published by Oxford University Press. All rights reserved.

Funding details

Funding sponsor	Funding number	Acronym
International Islamic University Malaysia	RIGS17-083-0658	

University of Melbourne
[See opportunities](#)

Funding text

The project was funded by OH-CRC, The University of Melbourne and the International Islamic University Malaysia, Kuantan, Pahang, Malaysia (RIGS17-083-0658).

Metrics [?](#)

0 Citations in Scopus
 0 Field-Weighted Citation Impact

Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)[Set citation feed >](#)

Related documents

Polymicrobial biofilm formation by *Candida albicans*, *Actinomyces naeslundii*, and *Streptococcus mutans* is *Candida albicans* strain and medium dependent

Arzmi, M.H. , Alnuaimi, A.D. , Dashper, S.
(2016) Medical Mycology

High-throughput quantitative method for assessing coaggregation among oral bacterial species

Levin-Sparenberg, E. , Shin, J.M. , Hastings, E.M.
(2016) Letters in Applied Microbiology

Cancer conundrum

Bavle, R.M. , Hosthor, S.S.
(2016) Journal of Oral and Maxillofacial Pathology



[View all related documents based on references](#)

[Find more related documents in Scopus based on:](#)

[Authors >](#)

References (47)

[View in search results format >](#)

All [Export](#)  Print  E-mail [Save to PDF](#) [Create bibliography](#)

- 1 Wilson, L.F., Antonsson, A., Green, A.C., Jordan, S.J., Kendall, B.J., Nagle, C.M., Neale, R.E., (...), Whiteman, D.C.
How many cancer cases and deaths are potentially preventable? Estimates for Australia in 2013

(2018) *International Journal of Cancer*, 142 (4), pp. 691-701. Cited 10 times.
[http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1097-0215](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1097-0215)
doi: 10.1002/ijc.31088

[View at Publisher](#)

- 2 Whitmore, S.E., Lamont, R.J.
Oral Bacteria and Cancer [\(Open Access\)](#)

(2014) *PLoS Pathogens*, 10 (3), art. no. e1003933. Cited 75 times.
<http://www.plospathogens.org/article/fetchObject.action?uri=info%3Adoi%2F10.1371%2Fjournal.ppat.1003933&representation=PDF>
doi: 10.1371/journal.ppat.1003933

[View at Publisher](#)

- 3 Rivera, C.
Essentials of oral cancer

(2015) *International Journal of Clinical and Experimental Pathology*, 8 (9), pp. 11884-11894. Cited 86 times.
<http://www.ijcep.com/files/ijcep0012234.pdf>

- 4 Khajuria, N.
Role of bacteria in oral carcinogenesis
(2015) *Indian J. Dent.*, 6, pp. 37-43. Cited 6 times.

- 5 Ferguson, B.L., Barber, S., Asher, I.H., Wood, C.R.
Role of Oral Microbial Infections in Oral Cancer

(2017) *Dental Clinics of North America*, 61 (2), pp. 425-434. Cited 3 times.
<http://www.sciencedirect.com/science/journal/00118532>
doi: 10.1016/j.cden.2016.12.009

[View at Publisher](#)

- 6 Meurman, J.H.
Infectious and dietary risk factors of oral cancer

(2010) *Oral Oncology*, 46 (6), pp. 411-413. Cited 50 times.
doi: 10.1016/j.oraloncology.2010.03.003

[View at Publisher](#)