Oral microorganisms: how do they communicate?

Many oral diseases are related to the interaction between microorganisms in the oral cavity. These microbial interactions are necessarily associated with the development of dental plaque and can lead to oral diseases including dental caries and perhaps oral cancer. It is estimated that up to 70% of people with a healthy oral cavity possess Candida albicans in their mouth. This normally does not harm the individual, however, in the event of disease, C. albicans may cause harm especially in those with a high carbohydrate diet, tobacco smoking or drug abuse. The objective of our study was to understand the communication between the most important oral microorganisms, the yeast, C. albicans strains, and bacteria, A. naeslundii and S. mutans.

![SEM images of microorganisms](image-url)

Fig. 1. SEM of C. albicans auto-aggregation (A & E), interkingdom interaction with A. naeslundii (B & F), S. mutans (C & G) and both bacteria (D & H). C. albicans was grown as hypha form (A, B, D & E) or yeast form (F, G & H). Magnification is as shown on each image (x6000x and x10000x).

To study this interaction, C. albicans that was grown as either long branching filaments (hyphae) as well as single budding yeast, and with A. naeslundii and S. mutans were suspended in separate sterile tubes containing buffer. The suspension was incubated for an hour at room temperature and the turbidity at 1 hour was measured using a spectrophotometer. The yeast auto-aggregated more when grown as hyphae than yeast for the majority of C. albicans strains. Further, co-aggregation of C. albicans with A. naeslundii and/or S. mutans was variable among C. albicans strains. Finally, scanning electron microscopy images showed that A. naeslundii and S. mutans co-aggregated with C. albicans (Figure 1). We can concluded that C. albicans communicate with A. naeslundii and S. mutans and this may contribute to the development of oral diseases such as dental caries.

Mahdi Hafiz Azrmi and Michael McCullough

Publication

Coaggregation of Candida albicans, Actinomyces naeslundii and Streptococcus mutans is Candida albicans strain dependent.

Azrmi MH, Dashper S, Catrulli D, Ciriello N, Reynolds E0, McCullough M

FEMS Yeast Res. 2015 Aug