INTRODUCTION

Denture-stomatitis (DS) affects approximately 65% of denture wearers and is one of the most common forms of oral candidiasis. The main species involved in oral candidiasis is Candida albicans, which is an opportunistic fungal pathogen that is problematic for people who are immunocompromised or have implanted medical devices. Environmental factors are important in the modulation of C. albicans biofilms, and investigating how such factors influence C. albicans pathogenicity will give a better insight into the risk factors for oral candidiasis. DS has increased prevalence in cigarette smokers, and non-smokers. Denture-stomatitis (DS) affects approximately 65% of denture wearers and is one of the most common forms of oral candidiasis. C. albicans, which is an opportunistic fungal pathogen that is problematic for people who are immunocompromised or have implanted medical devices. Environmental factors are important in the modulation of C. albicans biofilms, and investigating how such factors influence C. albicans pathogenicity will give a better insight into the risk factors for oral candidiasis. DS has increased prevalence in cigarette smokers, and non-smokers. Dental factors also contribute to the increased prevalence of DS, including the source of isolation, and their efficacy in preventing colonization and biofilm formation, expression of the virulence genes and hyphal production.

METHODS

Candida strains: Six strains of C. albicans were investigated including C. albicans SC5314, originally a clinical specimen from human infection and five clinical isolates (Table 1). Table 1. C. albicans clinical isolates studied including the source of isolation, and their efficacy at surface colonization and invasion. Poly(methyl methacrylate) (PMMA) Coupon Discs: PMMA is a thermoplastic used to construct denture prostheses and orthodontic retainers. Preconditioning PMMA coupons with tobacco condensate: PMMA coupons (8 mm) and 50 mL of artificial saliva were placed into the smoking apparatus (Fig. 1). Cigarettes with the filters removed were inserted into the holder indicated by an orange circle (Fig. 1). The smoke was drawn through the apparatus by the vacuum pump. A dreschel head released the smoke into the artificial saliva before it was drawn through the rest of the apparatus. Twenty cigarettes were ‘smoked’ to generate the condensate. Hypothesis and aims: We hypothesise that the chemically characterised tobacco condensate on denture acrylic surfaces will modify C. albicans biofilm development and alter expression of certain virulence characteristics. Assessment of moduation will involve investigating effects on adherence, biofilm quantity, virulence gene expression and hyphal transformation.

RESULTS/ CONCLUSIONS

- Level of C. albicans adherence and biofilm development to acrylic was strain dependent (Fig. 3).
- C. albicans adherence to tobacco condensate coated surfaces was generally lower than controls, with exception of strain 480/00 where tobacco condensate increased adherence.
- Biofilm coverage was highest on artificial saliva coated surfaces for C. albicans strain 705/93, SC5314, FB1/93 and 480/00. Strain 480/00 had highest biofilm coverage on uncoated surfaces.
- Hyphal adherence (90 min) to tobacco coated PMMA was again generally lower compared to control surfaces. After 24 h, the proportion of filamentous forms per unit area for C. albicans strain 705/93 was higher on the tobacco coated surface compared to controls, suggesting promotion of hyphal growth on this surface (Fig. 5).

FUTURE WORK

- Work is ongoing to ascertain the significance of these effects upon C. albicans pathogenicity.
- Changes in gene expression in response to the type of conditioning of virulence and hyphal associated genes is currently underway.
- Chemical analysis of the components adsorbed by the PMMA pre-conditioned with tobacco is ongoing.

REFERENCES


ACCREDITATIONS

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