Influence of *Candida albicans-Streptococcus mutans* cross-border interactions on the corrosion behaviour of Ti and Ti-Zr in artificial saliva

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Abstract： Oral microorganisms is one of the key factors leading to corrosion of titanium and its alloy implant materials. Currently, microbial-influenced corrosion (MIC) related to dental implant materials mainly focuses on bacteria. However, MIC associated with oral implant materials involves inherent interactions between fungi and bacteria, directly related to the formation of mixed biofilms. This suggests that fungal-bacterial interactions have potential clinical significance in MIC related to oral implant materials. In this study, we evaluated and compared the corrosion effects of *Streptococcus mutans*, *Candida albicans*, and mixed bacteria on implant materials pure Ti and Ti-Zr alloy. The results showed differences in biofilm structure, corrosion behavior, and mechanisms between single and mixed bacteria. The cross-kingdom interaction between *Streptococcus mutans* and *Candida albicans* enhanced biofilm maturity and acidity, providing necessary conditions for pitting corrosion. *Candida albicans* played a dominant role in the interaction between *Candida albicans* and *Streptococcus mutans*. Furthermore, we found that the addition of Zr to titanium-based alloys improved the alloy's biocompatibility and corrosion resistance. The results of this study provide a basis for better selection and application of oral titanium implant materials from the corrosion point of view, and provide ideas for evaluating the biocompatibility of oral implant materials.

Keywords: dental material; cross-kingdom biofilm; microbiologically influenced corrosion; acidogenicity;

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