

# Dentistry and Oral Health

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## Corrosion of titanium in response to sulfides produced from *Porphyromonas gingivalis*

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Sulfur has received much attention as a cause for titanium corrosion in the oral cavity because volatile sulfur compounds (VSC) are released in large amounts from periodonpathic bacteria and  $\text{Na}_2\text{S}$  has shown to corrode titanium through surface oxidation in past studies. The objective of this study was to determine the influence of sulfides produced by *Porphyromonas gingivalis* on the corrosion behavior of titanium. Commercially available pure titanium disks 1.3 mm thick and 13.0 mm in diameter were prepared and mirror polished. Titanium disks were immersed in culture medium (BHI), spent culture medium after culturing *Porphyromonas gingivalis* (*P. gingivalis*) (BHI-S), and culture medium with *P. gingivalis* (BHI-P). Specimens were placed in 3mL of test mediums and incubated aerobically at 37°C for 3 to 14 days; BHI-S and BHI-P mediums were renewed every 3-4 days. Bacterial growth was confirmed through surface observation (FE-SEM) and sulfide levels. Titanium corrosion was evaluated at 7 and 14 days through changes in color ( $\Delta E^*ab$ ) and glossiness ( $G_s(20^\circ)$ ) and titanium release using inductively coupled plasma emission spectroscopy.  $\Delta E^*ab$  and  $\Delta G(20^\circ)$  did not significantly differ among the specimens placed in test mediums for 7 and 14 weeks ( $p>0.05$ ). SEM images showed no signs of localized or overall corrosion on the specimens. Small amounts of titanium released in all test mediums however, no statistical differences were found between elution levels. Within the limitations of this study, sulfides produced by *P. gingivalis* did not cause corrosion in the form of discoloration and titanium release over the duration of 14 days.

### Biography

Rino Harada has completed her DDS at the age of 28 and PhD at the age of 32 from Tokyo Dental College. She is currently working as assistant professor in the dental materials department at Tokyo Dental College.

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