

## PIXE analysis of microelement included in oral lichen planus affection mucosa

S. Iijima<sup>1</sup>, S. Ishibashi<sup>2</sup>, Y. Sugiyama<sup>1</sup> and K. Sera<sup>3</sup>

<sup>1</sup>Division of Oral and Maxillofacial Surgery,  
Department of Reconstructive Oral and Maxillofacial Surgery,  
Iwate Medical University  
1-3-27 Chuodori, Morioka, Iwate 020-8505, Japan

<sup>2</sup>Oral Surgery, Hachinohe Red Cross Hospital  
2, Akedo, Tamonoki, Hachinohe, Aomori 039-1104, Japan

<sup>3</sup>Cyclotron Research Center, Iwate Medical University  
348-58 Tomegamori, Takizawa, Iwate 020-0603, Japan

### Abstract

Oral lichen planus is difficult to treat in some cases, because its cause has not been clarified. Previously proposed causes of this disease include metal allergy, hepatitis virus infection, endocrine abnormality, and psychological stress. Among these proposed causes, metal allergy is considered the most likely. Therefore, with the objective of identifying causative metals, we investigated elements present in the mucous membranes of 72 patients with oral lichen planus (OLP group) using direct PIXE analysis. Data for the oral mucosa of 100 healthy individuals accumulated at our department (healthy group) were used as controls. Mucous membranes affected by oral lichen planus were liquefied using the nitrate ashing method, and the elements present therein were analyzed using PIXE analysis at Iwate Medical University Cyclotron Center. Detection rates for the following elements were significantly higher in the healthy group than in the OLP group: Si, Co, Mn, Sn, As, Al, Ga, Sb, Hg, and Pb. On the other hand, detection rates for Au and Y were significantly higher in the OLP group than in the healthy group. As for levels of each element, levels of Cu, Ni, and Rb were significantly higher in the healthy group than in the OLP group, while levels of Al, Ti, Ga, and Y were significantly higher in the OLP group than the healthy group. In addition, levels of all pollutant elements except Pb tended to be higher in the OLP group, suggesting that these elements may have an effect. Comparison of element levels in the serum, mucous membranes, and saliva within the same individuals indicated that levels were highest in the mucous membranes, suggesting that elements accumulate in the mucous membranes via the serum and saliva through some unknown mechanism. Comparison of levels of pollutant elements in serum and saliva showed that Al and Ti were present at high levels in saliva, suggesting the possibility of an effect on OLP onset.