Structure of Vanadyl-Picolinate Complexes with Insulinomimetic Activities

Kazuhiko Ozutsumi, Yoshitane Kojima* and Hiromu Sakurai**

Abstract

The structure of bis(picolinato)oxovanadium(IV) ($[VO(PA)_2]\cdot 1.6H_2O$), bis(3-methylpicolinato)oxovanadium(IV) ($[VO(3MPA)_2]\cdot 1.5H_2O$), bis(6-methylpicolinato)oxovanadium(IV) ($[VO(6MPA)_2]$) and bis(5-iodopicolinato)oxovanadium(IV) ($[VO(IPA)_2]\cdot 2.0H_2O$) has been determined by the EXAFS method. The $[VO(PA)_2]\cdot 1.6H_2O$, $[VO(3MPA)_2]\cdot 1.5H_2O$ and $[VO(IPA)_2]\cdot 2.0H_2O$ complexes have a six-coordinate structure with an additional V–OH_2 bond. The $[VO(6MPA)_2]$ complex with no water molecule has a five-coordinate structure. The lack of water molecule may be caused by a steric hindrance of the 6-methyl groups. The V–O bond length in the five-coordinate $[VO(6MPA)_2]$ complex is 202 pm and shorter than those (205 pm) in the six-coordinate $[VO(PA)_2]\cdot 1.6H_2O$, $[VO(3MPA)_2]\cdot 1.5H_2O$ and $[VO(IPA)_2]\cdot 2.0H_2O$ complexes. On the other hand, the V–N bond length of 229 pm in the five-coordinate complex is longer than those (221-223 pm) in the six-coordinate complexes. The difference in the coordination structure around vanadyl ion involving the H_2O coordination was found to reflect the *in vitro* insulinomimetic action of the complexes.

Department of Chemistry, Faculty of Science and Engineering, Ritsumeikan University, 1-1-1 Noji-Higashi, Kusatsu, Shiga 525-8577, Japan

**Department of Chemistry, Graduate School of Science, Osaka City University, Sugimoto, Sumiyoshi-ku, Osaka 558-8585, Japan*

***Department of Analytical and Bioinorganic Chemistry, Kyoto Pharmaceutical University, 5 Nakauchi-cho, Misasagi, Yamashina-ku, Kyoto 607-8414, Japan*