

## **V + Zn – Can they treat diabetes and metabolic syndromes ?**

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Since the last half of 20th century, life-style involving eating habit of Japanese has dramatically changed, and approximately 20% of the population of Japanese adult suffer from type 2 diabetic mellitus (DM) (insulin resistance) or latent DM. This tendency has been increasing in the 21st century. At the same time, metabolic syndromes that concentrate in individual as risk factors containing obesity with internal organs, hypertension and hyperlipemia have been revealed to be contributed to arteriosclerosis.

To treat type 1 and 2 DM, insulin injection and administration of synthetic antidiabetic agents in addition to the exercise and diet have been clinically used, respectively. However, physical and mental pain and several side effects have been accompanied in insulin injection and synthetic drugs, respectively. Therefore, the development of clinically useful pharmaceuticals with a new concept has been anticipated worldwide.

Under these conditions, we have tried to propose the development of new compounds with metal complexes that treat both types of DM and metabolic syndromes on oral administration. Vanadyl(oxovanadium(IV))-cysteine methyl ester complex proposed in 1990 and zinc-maltol complex found in 2001 could treat type 1 and 2 DM, respectively, on oral administration. Encouraged with these new findings, we prepared a wide variety of vanadyl and zinc complexes with different coordination environments by altering the coordinating atoms around the metal centers, and examined their *in vitro* insulinomimetic and *in vivo* antidiabetic activities.

Recently, we newly found that several types of vanadyl and zinc complexes can treat not only type 2 DM but also metabolic syndromes in experimental animals on oral administration. In my talk, I will introduce our most recent results and discuss with the audience.