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Evaluation of the insulin-like activity of the vanadium (IV, V)-hydroxamic acid complexes using isolated rat adipocytes

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Abstract:

We synthesized a 1 : 2 complex between the vanadyl(IV) or vanadate(V) ion and benzohydroxamic acid (BHA), and assessed their insulin-like activity in terms of the inhibitory effects on free fatty acid release from the isolated rat adipocytes when stimulated with epinephrine. The vanadyl-BHA complex showed similar insulin-like activity to the inorganic vanadyl ion, while the vanadate complex was more effective than the vanadate ion. In addition, the vanadium contents of isolated rat adipocytes treated with the two complexes were determined by the graphite furnace atomic absorption spectrometry. The vanadyl- and vanadate-BHA treatments provided lower vanadium contents than the corresponding inorganic ions with the same oxidation states. Thus, the observed insulin-like activity did not necessarily correspond to the vanadium contents in the adipocytes. These results reflect the difference in the insulin-like activity in the subcellular region between the two complexes and the inorganic compounds in the IV and V oxidation states.

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