

# USANA Technical Bulletin

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## Vanadium

### Technical Background

- Vanadium is a trace mineral that functions as a cofactor that enhances or inhibits certain enzymes. It is also part of the building material of bones and teeth.
- Recent research has focused on vanadium's role in glucose metabolism, where it has been shown to improve or mimic insulin action.<sup>1</sup>
- One study on diabetic rats showed that vanadium increased insulin sensitivity and reduced plasma glucose, making it a good candidate for the prevention and maintenance of diabetes.<sup>2</sup>
- Another study on diabetic rats found that treatment with vanadium restored lipid levels in plasma and tissues to near-normal, helped restore the balance between LDL and HDL cholesterols, and restored the fatty acid compositions of the liver and kidneys.<sup>3</sup>

### Sources and Recommended Intake

- There is no Recommended Dietary Allowance (RDA) for vanadium.

### Abstract

*Verma S, Cam MC, McNeill JH. Nutritional factors that can favorably influence the glucose/insulin system: vanadium. J Am Coll Nutr. 1998 Feb;17(1):11-8.* A growing body of experimental and clinical research indicates that the trace element, vanadium, exerts potent insulin-mimetic effects in vitro and in vivo when used in pharmacological doses. Since our first demonstration of the anti-diabetic and cardioprotective effects of vanadium in vivo, impressive advances have been made in our understanding of its mechanism of action, pharmacokinetics and pharmacodynamics. A major advance in the use of vanadium as an insulin-mimetic has been the development of organic vanadium complexes which are 2 to 3 times as potent as inorganic vanadium and have been extensively studied in our laboratory. There is an emerging role for the use of vanadium in human diabetes and the recently conducted clinical trials support this contention. The present review summarizes some of the key aspects of vanadium biology which exemplify the potent insulin-mimetic, anti-diabetic and antihypertensive effects of this intriguing trace element.

### References

<sup>1</sup> Verma S, Cam MC, McNeill JH. Nutritional factors that can favorably influence the glucose/insulin system: vanadium. *J Am Coll Nutr.* 1998 Feb;17(1):11-8.

<sup>2</sup> Cam MC, Rodrigues B, McNeill JH. Distinct glucose lowering and beta cell protective effects of vanadium and food restriction in streptozotocin-diabetes. *Eur J Endocrinol.* 1999 Nov;141(5):546-54.

<sup>3</sup> Ramachandran B, Subramanian S. Amelioration of diabetic dyslipidemia by macrocyclic binuclear oxovanadium complex on streptozotocin induced diabetic rats. *Mol Cell Biochem.* 2005 Apr;272(1-2):157-64.