



Special Issue on **Vanadium Toxicological Potential versus Its Pharmacological Activity: New Developments and Research**

CALL FOR PAPERS

Vanadium (V) is an element that arouses interest of many research centers worldwide. The dual character of this metal, its multilevel actions, and the level of the complexity of its chemistry are well known. Due to its unique features, vanadium receives a great deal of attention from chemists, biologists, biochemists, toxicologists, and pharmacologists. As a biologically essential redox-active metal, it exhibits very specific behavior and it is able to evoke diametrically opposite effects. It may act as an antioxidant or as a strong prooxidant and attenuate the antioxidant defense system consequently leading to disturbance in the prooxidative-antioxidative balance called oxidative stress being an important aspect of toxicology.

One of the key areas of interest is the medicinal potential of vanadium-containing compounds and their feasible application in specific metallopharmaceutical design. Many scientists seek vanadium-based complexes in the hope of using them against world's threatening diseases, that is, some tropical diseases, and against cancer or diabetes, which are still rising. The range of applications of vanadium compounds in medicine is constantly expanding and numerous studies of the activity of complexes of this element have demonstrated promising results referring to their potential usage in medicine. On the other hand, the possibility of using vanadium-containing compounds as potent pharmacologically active agents redirected researchers' attention to the toxicological potential of this metal and its possible side effects.

Therefore, further studies are still required to fully understand and elucidate the toxicology as well as the biological and pharmacological activity of vanadium and to determine its toxicity and therapeutic intervals. It is also important to recognize the relationships between the structure and activity of novel potent vanadium complexes as well as to identify gaps in knowledge, which would lead to better understanding of the modes of action and mechanisms of transport of vanadium-based compounds. This may help to estimate the balance between adverse effects of vanadium and its potential therapeutic properties and thereby better develop possible procedures of treatment of the illnesses. Taking the above into account, we invite investigators to submit original research and review articles about selected aspects of vanadium action.

Potential topics include, but are not limited to:

- ▶ Design and pharmacological evaluation of novel vanadium-containing compounds as the next potentially efficient insulin-like agents (synthesis, characterization, structure analysis, mechanisms of action, *in vitro* and/or *in vivo* effects, and implications for clinical use)
- ▶ Current progress for development of the vanadium anticancer action: new good candidates showing the medicinal potential in antitumor treatment (synthesis, characterization, structure analysis, possible mode of action, and the most promising evidence demonstrated in the *in vitro* and/or *in vivo* studies)
- ▶ Vanadium-containing complexes with the most promising antiparasitic, antiviral, and antimicrobial activity, possible to be used as vanadium-based drugs in the future (synthesis, characterization, structure analysis, possible mechanisms of action, *in vitro* and/or *in vivo* effects, and implications for clinical use)
- ▶ Limitations in the usage of vanadium-containing complexes in therapeutic applications
- ▶ A summary of the current knowledge referring to the toxicology of vanadium including, *inter alia*, the mechanisms and some aspects of genetic and reproductive toxicology on the basis of the research obtained from biological models
- ▶ New perspectives in vanadium research

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