

## Basic Experimental Studies and Clinical Aspects of Gadolinium Salts and Chelates

L. Christofer Adding,<sup>1</sup> Gerard L. Bannenberg,<sup>1</sup> Lars E. Gustafsson<sup>1,2</sup>

<sup>1</sup>*Department of Physiology and Pharmacology, and* <sup>2</sup>*Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden.*

---

**Key Words:** Gadolinium chloride — Macrophage — Nuclear magnetic resonance imaging — Stretch — Stretch-activated ion channels

---

### ABSTRACT

Gadolinium is a lanthanide that has in recent years become more commonly present in our society. Organic chelates of gadolinium are increasingly used as contrast agents for the imaging of body fluids. Although adverse reactions to these agents are uncommon, it is known that gadolinium salts can bring about a wide variety of changes in physiology. Gadolinium chloride is widely used experimentally as an inhibitor of stretch-activated ion channels and physiological responses of tissues to mechanical stimulation. It is also employed as a selective inhibitor of macrophages *in vivo*. In this review, the known biochemical actions of gadolinium are brought together with its *in vivo* pharmacology and toxicology.