



**Beispiel: „Das Edelmetall Gold und die Paradoxie seiner Toxizität“**

**Gold, the noble metal and the paradoxes of its toxicology.** *Biologicals* 1998

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**Gold** is possibly the most ancient and, in its recent incarnation as a delivery vehicle for gene therapy, one of the most modern agents in all of medicine's pharmacopoeia. Its administration to humans is both deliberate and inadvertent. It is universally recognized as the most inert of metals, yet it can be sensitizing. **Gold**'s broadest clinical application (in rheumatoid arthritis) derives from a premise that was totally flawed. It is employed clinically to effect immune suppression yet it can engender toxicities that stem from immunostimulation. To complete this series of paradoxes, the **toxicity of gold**, unlike that of most pharmaceuticals, is, in general, not predictably related to the levels it attains within bodily tissues. Accordingly, the pharmacology and toxicology of **gold** is remarkably complex. Recent laboratory discoveries concerning **gold**'s metabolism, have emphasized the important metabolic differences between its three oxidation states (0, I and III). When placed in the context of a wealth of clinical experience, these discoveries provide useful insights into its toxicology and shine a revealing light on the mechanisms which account for its seemingly paradoxical behaviour.

**Zusammenfassende Übersetzung der Ergebnisse:**

Obwohl Gold ein wenig reaktionsfähiges Material ist, kann es dennoch Sensibilisierungsreaktionen auslösen. Gold kann sowohl Immunreaktionen dämpfen (Rheuma-Therapie) als auch toxisch wirken über eine Immunstimulation. Gold-Reaktionen sind höchst widersprüchlich und sind abhängig von den Oxidationszuständen der Goldsalze (0, I und III).



Gibt es noch weitere Literatur zur **Toxizität von Gold?**

Nakagawa T et al.: Effect of gold salts on the IgE immune response in mice. Ann Allergy 40 (1978) 272-275

Graham G: Medicin81 chemistry of gold. Agents Actions Suppl44 (1993) 209-217

Dillard CJ, Tappel AL: Are some major in vivo effects of gold related to microenvironments of decreased selenium? Med Hypotheses 20 (1986) 407-420

Wollheim FA: Mechanisms of gold resistance. Agents Actions Suppl 24 (1988) 178-183

Björkner B: High frequency of contact allergy to gold sodium thiosulfate. An indication of gold allergy? Contact Dermatitis 30 (1994) 144-151

Möller H et al.: Flare-up at contact allergy sites in a gold-treated rheumatic patient. Acta Derm Venereol (Stockh) 76 (1996) 55-58

Wicks IP et al.: Contact allergy to gold after systemic administration of gold for rheumatoid arthritis. Ann Rheum Dis 47 (1988) 421-422

Rapson W: Skin contact with gold and gold alloys. Contact Dermatitis 13 (1997) 56—65

Bergenholtz, A.: Studies of the transport of metal ions from gold inlays into environment tissues. Acta Odonto Scand., vol.23,Nr.2,1965.

Bersin, Th.: Zur Biochemie des Mineral- und Spurenelementstoffwechsels. Akad. Verlagsanstalt, Ff/M. 1963

Bobik A, Campbell JH: Vascular derived growth factors: Cell biology, pathophysiology and pharmacology. Pharmacol Rev 1993; 45: 1-42.

Brandes ME, Allen J, Ogawa Y, Wahl SM: Transforming growth factor 1 suppresses acute and chronic arthritis in experimental animals. K Clin Invest 1991; 87: 1108-1113.

Catsch, A. 1968. Dekorpierung radioaktiver und stabiler Metallionen, pp.20-31. Munich: K. Thieme. 176 pp.



## Akademie für Integrative Medizin, Zahnmedizin und Bewusstseinstechniken

Chensue, S. W., Ward, P. A.: Inflammation. In Anderson's Pathology (eds. Damjanov, I. and Linder, J.), Mosby, St. Louis, 1996, pp. 387 - 415.

Cotran, R. S.: Infammation and Repair. In Basic Pathology (eds. Robbins S. L. and Kumar, V.), W. Saunders Company, Philadelphia, 1987, pp. 28 - 61.

DeStefano f. et al.: Dental disease and risk of coronary heart disease and mortality. Br Med J306:688-691

Flescher E, Ledbetter JA, Schieven GL, Vela-Roche N, Fossum D, Dang H, Ogawa N, Talal N: Longitudinal exposure of human T-lymphocytes to weak oxidative stress suppresses transmembrane and nuclear signal transduction. J Immunol 1994; 153: 4880-4889.

Frizzel, M.: Studies on the Transport of Axonal Proteins in Normal and Regenerating Hypoglossal and Vagus Nerves of the Rabbit. MD Thesis: Göteborg Univ., Schweden 1974

Furst, A. et Coll: Possible Mechanism of metal ion carcinogensisi, Acad.Sciences Humanities, 1969.

Hauss, W. H., Junge-Hülsing, G., Gerlach, U.: Die unspezifische Messenchymreaktion. Georg Thieme Verlag, Stuttgart 1968.

Israel N, Geougerot-Pocidalo MA, Aillet F, Virelizier JL: Redox status of cells influences constitutive or induces NF-kappa B translocation and HIV long terminal repeat activity in human T and monocytic cell lines. J Immunol 1992; 149: 3386-3393.

Kabat,E.: Structural Concepts in Immunology and Immunochemistry, Holt, New York (1976)

**Kuruvilla AP; Shah R, Hochwald GM, Liggitt HD, Palladino MA, Thorbecke GJ:** Protective effect of transforming growth factor 1 on experimental autoimmune disease in mice. Proc Natl Acad Sci USA 1991; 88: 2918-2921.