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### New biocompatible oxide nanoparticles as carriers of bioactive compounds through the blood-brain barrier

Blood-brain barrier is major obstacle for drug delivery to the brain. In this study, we focused on oxide Nano Particles (NPs) as potential drug carriers. Mice received suspension of  $Y_2O_3:Tb:Lectin$  NPs (10 mg/ml; 0.3 ml/mouse) via gastric gavage (IG) and were sacrificed after 24 hr, 48 hr and 1 week. Control group received equivalent suspension of pure lectin. All protocols were conducted according to EU guidelines and approved by LEC agreement no. 44/2012. Following the sacrifice, brain tissue was collected for the analyses under confocal microscope and scanning cytometry. Lectins were chosen as a perfect model substance for the use of NPs as carriers, since physiologically they are not absorbed from the gastrointestinal tract. Control group exhibited extremely low signal for lectin not exceeding background level. In the group which received  $Y_2O_3:Tb:Lectin$ , signal for lectin coincided with NPs red fluorescence in the brain as soon as 24 hr after IG. Following 48 hours, the convergence lowered and after 1-week only free lectin was observed in the brain tissue. In conclusion, oxide NPs proved able to transport bioactive compounds through the blood-brain barrier. After entering brain tissue complexes of nanoparticles and lectin dissolved and free lectin was deposited in the tissue.

### Biography

Michal M Godlewski is currently the Vice-Dean for International Studies at the Faculty of Veterinary Medicine, WULS-SGGW. He has completed his PhD in 2003 and received Habilitation in 2015. Currently, he manages Cytometric Laboratory of the Department of Physiological Sciences and Laboratory of Nanotechnology and Nanoengineering in the Veterinary Research Centre; Centre for Biomedical Research of the Department of Large Animal Diseases with clinic. He is a recognized expert in the field of nanoparticle applications for medicine. His recent scientific interest relates to the interactions of nanomaterials with living organism and the development of nanoparticles for bio-medical applications. He is the author/co-author of 60 papers in the WoS database and over 10 chapters in academic monographies, cited over 500 times.

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