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WGX-50, a drug candidate from Sichuan pepper and its potential role against ad and in anti-aging

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Based on structure of membrane protein targets acquired by bioinformatics tools and database of molecules extracted from the Traditional Chinese medicines, various cheminformatics procedures were performed to screen for potential active compounds. Many promising molecules were obtained, for example, agaritine and wgx-50 was singled out through similarity search, molecular docking and molecular dynamics simulations. *In vivo*, the pharmacological kinetics profiles of wgx-50 were obtained to evaluate the effect of wgx-50 on cognition ability of scopolamine induced acute memory damage mice and Amyloid Precursor Protein transgenic (APP-Tg) mice by Morris water maze testing (MWM) and the β -amyloid ($A\beta$) oligomerics in the brain of APP-Tg mice by immunohistochemistry. *In vitro*, the direct effect of wgx-50 on $A\beta$ oligomerics was observed by the atomic force microscope; the neurocyte protection by Western blot and cell apoptosis assay; and measured intracellular calcium current ($[Ca^{2+}]_i$) by Laser confocal microscopy. Experiments *in vivo* showed that wgx-50 could penetrate the blood brain barrier and improve the cognition ability and decrease the $A\beta$ oligomeric accumulation on cerebral cortex. Results *in vitro* displayed that wgx-50 could disassemble the $A\beta$ oligomerics, inhibit $A\beta$ -induced neurocyte apoptosis as well as apoptotic gene expression, and relieve neuron calcium intoxication. These results strongly suggest that wgx-50 possess biologic functions against AD. Discoveries were also made in its potential role in anti-aging.

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Removal of iron colloid substances from aqueous solutions using pulsed corona discharge

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Pulsed electric discharge has been used for the removal of iron colloid substances from aqueous solutions. The residual concentration of organic substances in aqueous solution depends on the pulse repetition rate. The maximum decrease in organic substances concentration was observed at the pulse repetition rate of 800pps. Comparison of the results obtained for iron colloid solutions containing humic substances and solutions of humic substances with no colloids show that the highest removal efficiency of organic substances was obtained when no iron and silicon ions were present in the solution. The results of our experiments suggest that pulsed electric discharge treatment for the removal of organic substances from natural waters is more efficient at an after-treatment stage, after precipitation of colloid substances.

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