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Polymeric nanoparticles for controlled release of synergic system posaconazole/temozolomide

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Background: Polymeric nanoparticles can be considered systems with increased therapeutic performance since they are able to low the toxicity and side-effects, increase bioavailability and efficacy of different drug classes.

Objective: The aim is developing polymeric nanoparticles containing the drugs temozolomide (TMZ) and posaconazole (PSZ) (TMZ-PSZ NPs) as promise to application in cancer therapy, and evaluated its physical, chemical and spectroscopic properties.

Methods: TMZ-PSZ NPs were prepared by the solvent evaporation technique. Parameters such as particle size, drug encapsulation efficiency, external morphology, and in vitro release behavior were evaluated. The spectroscopic properties (absorption, fluorescence, FTIR) were evaluated in organic solution and when encapsulated in nanoparticles.

Results: Scanning electron microscopy and dynamic light scattering revealed that TMZ-PSZ NPs are spherical in shape, and they have a diameter of 245.5 ± 23.0 nm and a low tendency to aggregate with zeta potential of -18.73 ± 3.43 mV. The entrapping efficiency obtained in this procedure was 79%. Spectroscopic analysis showed that the drugs did not undergo structural alteration when loaded with nanoparticles.

Conclusions: The TMZ-PSZ NPs have suitable physical, chemical and morphological characteristics, dealing for the future tests delivery system as an alternative cancer therapy due to its excellent biodegradability, biocompatibility, and maintenance of its spectroscopic properties when compared with drugs in homogenous media. The biocompatible DDS medium is a new proposal and will make feasible the use of TMZ-PSZ NPs for cancer therapy, improving the utilization of non-organic media to deliver this kind of molecule. Supported by FAPDF, CNPq, CAPES, FINATEC.

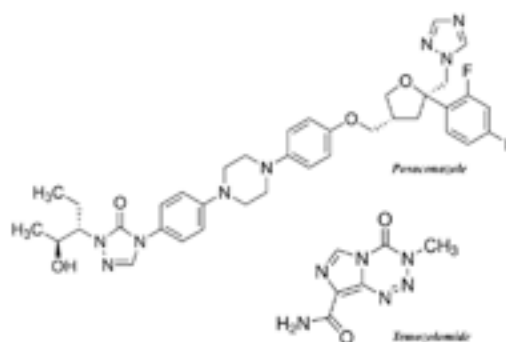


Figure 1: Chemical structure of temozolomide and posaconazole

Biography

Anderson de Jesus Gomes has completed the bachelor degree in chemistry from the Federal University of Uberlandia in 1995, master's in chemistry from the University of Sao Paulo in 1998, PhD in chemistry from the University of Sao Paulo in 2003 and postdoctoral studies from the University of Sao Paulo in 2007 and the Columbia University in 2014. He is the associate professor of chemistry in University of Brasilia since 2008. He has experience in chemistry and his research interest is focusing on photochemistry and nanotechnology. He has published more than 25 papers in reputed journals.

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