Encapsulating TGF-β1 inhibitory peptides P17 and P144 as a promising strategy to facilitate their dissolution and to improve their functionalization.

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Abstract (300 word limit)

Transforming growth factor-beta (TGFβ1) is considered as a master regulator for many intracellular signaling pathways, including proliferation, differentiation and death, both in health and disease. It further represents an oncogenic factor in advanced tumor allowing cancer cells to be more invasive and prone to move into metastatic process. This finding has received great attention for discovering new therapeutic molecules against TGFβ1 pathway. Among many TGFβ1 inhibitors, peptides (P17 and P144) were designed to block TGFβ1 pathway. However, their therapeutic applications have limited use, due to lack of selection for their targets and their possible recognition by immune system and further due to their potential cytotoxicity on healthy cells. Besides that, P144 is a highly hydrophobic molecule with less dissolution even in organic solution. Here, we aimed to overcome dissolution of P144, as well as design nano-delivery strategies to provide protection for normal cells, to increase cellular penetration and to raise the targeted therapy of both P17 and P144. Peptides were encapsulated in moieties of polymer hybrid protein. Their assembly was investigated by TEM, microplate spectrum analysis and fluorescence microscopy. SMAD phosphorylation was analyzed by western blot as a hallmark of their biological efficiency. The results showed that encapsulation of P17 and P144 might improve their potential therapeutic applications.

Recent Publications (minimum 5)

1) **Hanafy, et al.** Materials Science & Engineering C.,2020: 111119.
2) **Hanafy, et al.** *Pharmaceutics* 2020, *12*, 421.
3) Magdy, **Hanafy, N**. et al. Cell. Toxicol. (2020).
4) **Hanafy, et al.** *Appl. Sci.* 2019, *9*(5), 825
5) **Hanafy, et al. Int J Mol Sci. 2018 Mar 6;19(3).**



Biography (150 word limit)

Hanafy obtained his bachelor degree (with very good grade, 81.2%) in a biological department - Al Azhar University Egypt. Hanafy achieved the qualification of pre master courses for one full time year with very good marks. In February 2006, Hanafy joined Kuwait university where he developed excellent technical skills in histopathological animal model studies with 5 publications in international peer reviewed journals varying from experimental and therapeutic medicine, nanoscience and nanotechnology to cytology. In 2013, Hanafy was awarded a full time three year contract as a scientific researcher by Marie Curie fellowship and admitted to the Italian Council National Research /Nanotechnology institute. After 6 months there, Hanafy joined a PhD position at Italian Salento University. He ran a very successful project in fabrication of multifunctional drug delivery system, with to date, 60 publications (peer reviewed journal, case reports, scientific abstract, mini review, data raw) with more than 30 presentations across the world.

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