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Nanotheranostics: TPGS micelles for early diagnosis and therapy of cancer

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Nanotheranostics have shown the development of advanced platforms that can diagnose cancer at early stages, initiate first-line therapy, monitor it, and if needed, rapidly start subsequent treatments. In nanotheranostics, therapeutic and diagnostic agents are loaded with nanomedicine in a single theranostic platform, which can be further developed as clinical formulations for targeting different types of cancer. This speech is concerned about theranostic micelles developed using TPGS (tocopheryl polyethylene glycol succinate), docetaxel and gold nanoclusters for the early diagnosis and therapy of cancer with advanced features. Micelles are amphiphilic spherical nanostructures consisting of hydrophilic shell and hydrophobic core. Micelles have advantages such as thermodynamic stability, kinetic stability, higher payload and smaller dimension (less than 50 nm). In our group, various research studies were done on targeted micelles for cancer diagnosis and therapy. In future, nanotheranostics will be able to provide personalized treatment which can make cancer even curable or at least treatable at the earliest stage.

Recent Publications

1. Muthu M S, Mehata, A K Viswanadh and M K (2017) Upconversion nanotheranostics: Emerging designs for integration of diagnosis and therapy. *Nanomedicine*. 12(6): 577-580.
2. Sonali et al. (2018) Nanotheranostics: Emerging strategies for early diagnosis and therapy of brain cancer. *Nanotheranostics*. 2(1):70-86.
3. Tay C Y et al. (2016) Reality check for nanomaterials-mediated therapy with 3D biomimetic culture systems. *Advanced Functional Materials*. 26(23):4046-4065.
4. Muthu M S et al. (2015) Theranostic Vitamin E TPGS micelles of transferrin conjugation for targeted co-delivery of docetaxel and ultra bright gold nanoclusters. *Biomaterials*. 39:234-248.
5. Muthu M S et al. (2014) Nanotheranostics: Application and further development of nanomedicine strategies for advanced theranostics. *Theranostics*. 4(6):660-677.

Biography

Muthu Madaswamy Sona earned his Bachelor's Degree in Pharmacy in 2002; Master's Degree in Pharmaceutical Technology from India in 2004 and PhD Degree in Pharmaceutics from IIT, Varanasi, India in 2009. He did his Postdoctoral trainings in the Department of Chemical Engineering at National University of Singapore as a Recipient of Boyscast Fellowship and CREST Award from India. He is also an Awardee of DST Young Scientist in 2012. His research interest is to develop advanced nanomedicine as novel platform for diagnosis and therapy. He has authored over 64 peer-reviewed publications with a cumulative impact factor of >240, citation of 2100 and h-index of 24.

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