

Keynote: Impact of nanobiotechnology on the future of medicines: The road toward precision medicines –Case studies

Shaker Mousa

Albany College of Pharmacy, NY, USA

Prof. Mousa is the Executive VP and chair of PRI at Albany, NY. He is the founder of the Pharmaceutical Research Institute in 2002 and the founders of spin-off Pharmaceutical and biotechnology companies. He held a senior, principal research scientist and a research fellow at DuPont Pharmaceuticals and Imaging Co., DuPont Merck, and DuPont Pharmaceuticals Company for two decades. He held academic appointments of Adjunct Professor in the Department of Medicine, Sol Sherry Thrombosis Research Center, at Temple University, the State University of New York at Buffalo/Albany, Rensselaer Polytechnic Institute. Awarded the 2017 Kuwait Foundation for Advancement in Sciences (KFAS) Laureate for Applied Sciences in Medicine. Awarded in 2018 fellow of the National Academy of Inventors (FNAI), Awarded in 2020 the first Sheikh Zayed International Award in Traditional Complementary and Alternative Medicine (TCAM), in Prophetic Medicines for improved human health and quality of life. In 2020, he ranked by Stanford ranking to be among the top 1% of globally impactful scientist. His current googles scholar citation over 35,000; h-index 100. Among his professional accomplishments are his contributions to several patents and to the discovery and development of novel anti-platelet, anti-thrombotic therapies, noninvasive myocardial perfusion, and thrombus imaging agents. His work is reported in over 1,000 peer-reviewed publications and holds over 400 US Patents and International Patents. His early work in Neuropharmacology involved the biochemical and pharmacological interplay between hormonal and neuronal factors in pain modulation. He contributed to the discovery and development of FDA approved products / clinical candidates: **Cardiolite[®]**, **Roxifiban** (Anti-platelet / Anti-thrombotic agent for the prevention and treatment of coronary, carotid, and peripheral artery thromboembolic disorders). Involved in the discovery of novel site directed anti-avb3 tumor radiotherapy and imaging. He is also involved in the discovery of novel pharmacological aspects of heparins and non-anticoagulant heparin derivatives. He contributed to the advancement of several key concepts including: the synergistic benefits of GPIIb/IIIa antagonists in combination with thrombolytic; the role of integrin alpha5/beta1 in angiogenesis and bacterial invasion of human host cells, the role of fibrinolytic components such as kininogen in angiogenesis.



ABSTRACT

Over the past decade, evidence from the scientific and medical communities has demonstrated that nanobiotechnology and nanomedicine have tremendous potential to affect numerous aspects of cancer and other disorders in term of early diagnosis and targeted therapy. The utilization of nanotechnology for the development of new Nano-carrier systems has the potential to offer improved targeted delivery through increased solubility and sustained retention and more importantly active targeting. One of the major advantages of this innovative technology is its unique multifunctional characteristics. Targeted delivery of drug incorporated nanoparticles, through conjugation of site-specific cell surface markers, such as tumor-specific antibodies or ligands, which can enhance the efficacy of the anticancer drug and reduce the side effects. Additionally, multifunctional characteristics of the Nano-carrier system would

allow for simultaneous imaging of tumor mass, targeted drug delivery and monitoring (**Theranostics**). A summary of recent progress in nanotechnology as it relates to nanoparticles and drug delivery will be reviewed. Nano Nutraceuticals using combination of various natural products provide a great potential in diseases prevention. Additionally, various Nanomedicine approaches for the detection and treatment of various types of organ specific delivery, vascular targeting, and vaccine will be briefly discussed. Additionally, novel Ligand-Drug Conjugates and Ligand conjugated Nano loaded with active Pharmaceuticals versus Antibody-Drug Conjugates will be briefly highlighted.

Reference

- [1] Mousa SA, Bawa R, and Audette GF (Editors): *The Road from Nanomedicine to Precision Medicine*, Jenny Stanford Publishing (2020) – 1200+ pages, 36 chapters [ISBN 978-981-4800-59-4 (Hardcover), 978-0-429-29501-0 (eBook)].