ISSN: 2157-7439
Journal of Nanomedicine & Nanotechnology

OPEN ACCESS Freely available online

Letter

A Brief Note on Anti-Cancer Nanomedicine in Industrial Perspective

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INTRODUCTION

Nanomedicines have been studied for their potential use in the targeted delivery of drugs to treat a wide range of diseases. This industry perspective focuses solely on oncology-based nanomedicine therapeutics, which receives approximately two-thirds of research attention. The concept that nanomedicines aim to improve the therapeutic index of anti-cancer drugs by modifying their pharmacokinetics and tissue distribution to improve delivery to the site of action is well understood and has been clinically demonstrated. Liposomal doxorubicin was the first anti-cancer nanomedicine approved by the FDA in 1995. It was designed to take advantage of the enhanced permeability and retention effect. DoxilTM/CaelyxTM achieves differential doxorubicin distribution versus free drug and is now approved for several indications based on improved safety with equivalent efficacy. Prior efficacy in comparison to standard therapies. DoxilTM has achieved a nearly 300-fold increase in area under the curve in patients when compared to free doxorubicin, though this includes both free (bioavailable) and liposome-encapsulated (non-bioavailable) doxorubicin [1].

MyocetTM, DaunoXomeTM, DepocytTM, AbraxaneTM, Genexol- PMTM, and, most recently, OnivydeTM are some of the other nanomedicines approved for clinical use in cancer treatment. The approval of new nanomedicines has been based primarily on improving therapeutic benefit through increased safety, with patient survival being comparable to that obtained with standard treatments. Many novel nanomedicines' significant anti-cancer activity has yet to be replicated clinically, and as a result, the development of marketed nanomedicines has frequently been slow. Nanomedicine-based treatments many key opinion leaders in the nanomedicine field, including refs, have written excellent articles outlining the obstacles to the successful development of novel nanomedicine therapeutics and suggestions for overcoming these obstacles [2]. AstraZeneca has improved its success in translating new drug projects to the clinic by evaluating the 5Rs of a drug: 'right target/efficacy,' 'right tissue/exposure,' 'right patients,' 'right safety,' and 'right commercial potential'. This means that the pre-clinical data must be consistent with the agent's ability to achieve target engagement or inhibition in humans—via the appropriate level of drug exposure at the target tissue, as determined by in vitro and in vivo screening. Projects with a well-defined therapeutic margin and a thorough understanding of the agent's adverse toxicity profile are more likely to be advanced. Furthermore, a patient selection hypothesis and appropriate biomarkers must be in place. Finally, the project must focus on the right, commercially appealing patient population. Although there is significant overlap across categories, anti-cancer nanomedicines in clinical development can be broadly categorized into five types: liposomes, polymeric conjugates, polymeric nanoparticles, polymeric micelles, and others. Outside of the focus of this study, antibody-drug conjugates were considered as a significant therapeutic class separate from the particulate nanomedicine systems mentioned here. Summarize examples of marketed anti-cancer nanomedicines as well as those in clinical research [3].

The majority of approved anti-cancer nanomedicines were designed to take advantage of the EPR effect, with a small subset of nanomedicines BIND Therapeutics and MM-302 Merrimack Pharmaceuticals attempting to alter nanomedicine behavior further with ligand-mediated targeting. EPR-based treatments attempt to increase efficacy and tolerance by changing the way the body works. the drug's pharmacokinetics and bio distribution They can reduce the peak free drug concentration (Cmax) while increasing the area under the curve in plasma and the tumour, resulting in sustained exposure to therapeutic drug levels at the target. Several nanomedicines have conferred a significantly increased therapeutic index to an existing therapy or permitted new creative treatment techniques by reaching the "appropriate target" and "correct exposure. In pre-clinical testing, the AZD2811 nanoparticle used an unique encapsulation of an Aurora-B kinase inhibitor to decrease dose-limiting bone marrow toxicity, and it is now in early clinical studies [4].

Some nanomedicines have the advantage of being able to construct a medicament without the use of dose-limiting harmful excipients. While solubilization benefits are not a primary emphasis for many nanomedicine research initiatives, they can be very cost-effective. Furthermore, by obtaining the "correct safety" profile, this technique can have a major impact on patients and clinical outcomes, since the maximum tolerated dose of the active agent can be increased by avoiding the tolerability issues produced by solubilizing surfactants.

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Received: 3-Mar-2022, Manuscript No: jnmnt-22-15871, **Editor assigned:** 6-Mar-2022, PreQC No: jnmnt-22-15871(PQ), **Reviewed:** 11-Mar-2022, QC No: jnmnt-22-15818, **Revised:** 17-Mar-2022, Manuscript No: jnmnt-22-15871 (R), **Published:** 25-Mar-2022, DOI: 10.35248/2157-7439.22.13.609.

Citation: Yu H (2022) A Brief Note on Anti-Cancer Nanomedicine in Industrial Perspective. J Nanomed Nanotech. 13: 609.

The increasing expense of nanomedicine systems, however, may preclude them from becoming a common therapeutic option until their efficacy improves. It is critical to engage with 26 for the future generation of treatments [5].

Conflict of Interest

None

Acknowledgement

None

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