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Therapeutic efficacy and safety of nanomedicines: Current progress and future directions

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Nanomedicine is a promising candidate for passive and targeted drug delivery. Doxil (Doxorubicin loaded stealth liposomes) and abraxane (human serum albumin nanoparticles conjugating paclitaxel) are commercially viable examples of nanomedicine. Despite favorable therapeutic applications as well as pharmacokinetic and pharmacodynamic attributes, fate of nanomedicine and its safety still need to be addressed. Certain factors such as route of administration, aggregation behavior and deposition of nanomedicine in body cavities should be considered for a successful treatment approach. Owing to absence of adequate data, multidisciplinary qualitative and quantitative tests should be incorporated to understand toxicity of nanomedicines. In this context, certain biomaterials have been approved by USFDA for engineering the next generation of medicines. Therefore, in present investigation, we have enlisted the toxicity and safety issues of nanomedicines. Moreover, attention has also been paid to various tests that can be employed for the assessment of next generation medicines. For collecting the data on safety and toxicity of nanomedicines, popular research websites like Science Direct and PubMed Central were used. In addition, various regulatory websites like USFDA were also explored for collecting the data on standards for nanomedicines. The outcome of literature survey indicated the presence of gaps between existing knowledge and specific areas which should be addressed in making the framework for the assessment of safety and toxicity of nanomedicines. A standard and stringent set of parameters should be framed for vigorously testing the safety and toxicity of nanomedicines.

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