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EDITORIAL

Personalized nanomedicine: future medicine for cancer treatment

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Cancer as a grave disease is becoming a larger health problem,[1] and the medicines used as treatments have clear limitations.[2–4] Chemotherapy, radiation, and surgery, all of which are drastic treatments, wreak havoc on healthy cells and tissues as well as cancerous ones.[5–7] Pathophysiologically, there are more than 200 types of cancers,[8,9] each with many variants.[10] Some are aggressive, some are not; some are easily treated, and others are always fatal.[11]

Unlike previous "revolutions" in the "war" on cancer that raised hope, nanomedicine is not just one more tool, it is an entire field, and the science in this area is burgeoning, and benefiting from use of modern cutting edge molecular tools.[12–14] These breakthrough advancements have radically changed the perception of future medicine. Importantly, they are enabling landmark research to combine all advances, creating nanosized particles that contain drugs targeting cell surface receptors and other potent molecules designed to kill cancerous cells.[15–19] If there is a case to be made for personalized medicine, cancer is it. For example, the current literature reveals the need for a great scientific effort to be made in this field.[20–22] However, new paradigms are needed to interpret toxicogenomic and nanotoxicological data in order to predict drug toxicities and gain a more indepth understanding of the mechanisms of toxicity, so that more specific therapeutic targets which are essentially devoid of side effects could be selected.[23,24]

The future of nanomedicine and the opportunity to eliminate the suffering and death due to cancer will hinge on our ability to confront cancer at its molecular level.[25] Nevertheless, there are many outstanding questions that remain unanswered. A revolution in nanoscience is now heralding a long-awaited era of personalized cancer treatment that is now much closer than ever before. Personalized medicine will ensure that such drugs are given only to patients who stand to benefit from them. If that happens, nanobased drugs will be at least less toxic than today's armamentarium for cancer. If they work as intended, they should also prove to be far more effective.

Disclosure

The author reports no conflicts of interest in this work.

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