molecular pharmaceutics

preface

Nanoparticles for Imaging, Diagnosis, and Therapeutics

We are at the threshold of a new era in cancer treatment and diagnosis, brought about by the convergence of two disciplines—materials engineering and life sciences—that even 10 years ago might have been difficult to envision. The product of this curious marriage, nanobiotechnology, is yielding many surprises, and fostering new hopes in the biomedical community in general, and among cancer biologists and clinical oncologists in particular. Nanoparticles, engineered to exquisite precision using polymers, metals, lipids, and carbon, have been combined with molecular targeting and imaging and therapeutic techniques to create a powerful set of tools in the fight against cancer. The unique properties of nanomaterials enable selective drug delivery to tumors, novel treatment methods, intraoperative imaging guides to surgery, highly sensitive imaging agents for early tumor detection, and real-time monitoring of response to treatment.

This special issue of *Molecular Pharmaceutics* describes key research aimed at developing nanoparticle-based agents for use in diagnosing, imaging, and treating cancer and other life-threatening diseases. Coming on the heels of the *2008 Cleveland NanoMedicine Summit* hosted by the Cleveland Clinic, Case Western Reserve University, and the Northeast Ohio Technology Coalition (NorTech), this collection of papers provides a thorough overview of the technologies that researchers are bringing to bear on the problem of developing targeted nanoscale agents for use in humans.

The ultimate goal of the work reviewed here is not to develop biomedical nanomaterials just for the sake of capitalizing on new technology. As these papers point out, the driving force for nanotechnologists is to use these new technologies to solve some of the most pressing problems in disease treatment and detection. I invite you to read these papers; they illuminate new, paradigm shifting opportunities arising from exciting multidisciplinary work of nanotechnologists, biologists, and clinicians.

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