demonstrated in preclinical models in vivo. Present achievements in: (i) preparation of liposomal formulations of VE analogues, (ii) physicochemical characterization of these developed systems, and (iii) testing of their biological activity such as induction of apoptosis and evaluation of anti-cancer effect are discussed in this review.

Lammers, T. et al. (2011). "Theranostic nanomedicine." *Acc Chem Res* 44(10):1029–1038.

Nanomedicine formulations aim to improve the biodistribution and the target site accumulation of systemically administered (chemo)therapeutic agents. Many different types of nanomedicines have been evaluated over the years, including, for instance, liposomes, polymers, micelles, and antibodies, and a significant amount of evidence has been obtained showing that these submicrometer-sized carrier materials are able to improve the balance between the efficacy and the toxicity of therapeutic interventions. Besides for therapeutic purposes, nanomedicine formulations have in recent years also been increasingly employed for imaging applications. Moreover, paralleled by advances in chemistry, biology, pharmacy, nanotechnology, medicine, and imaging, several different systems have been developed in the last decade in which disease diagnosis and therapy are combined. These so-called (nano) theranostics contain both a drug and an imaging agent within a single formulation, and they can be used for various different purposes. In this Account, we summarize several exemplary efforts in this regard, and we show that theranostic nanomedicines are highly suitable systems for monitoring drug delivery, drug release, and drug efficacy. The (pre)clinically most relevant applications of theranostic nanomedicines relate to their use for validating and optimizing the properties of drug delivery systems, and to their ability to be used for prescreening patients and enabling personalized medicine. Regarding the former, the combination of diagnostic and therapeutic agents within a single formulation provides real-time feedback on the pharmacokinetics, the target site localization and the (off-target) healthy organ accumulation of nanomedicines. Various examples of this will be highlighted in this Account, illustrating that by non-invasively visualizing how well carrier materials are able to deliver pharmacologically active agents to the pathological site, and how well they are able to prevent them from accumulating in potentially endangered healthy tissues, important information can be obtained for optimizing the basic properties of drug delivery systems, as well as for improving the balance between the efficacy and the toxicity of targeted therapeutic interventions. Regarding personalized medicine, it can be reasoned that only in patients which show high levels of target site accumulation, and which respond well to the first couple of treatment cycles, targeted therapy should be continued, and that in those in which this is not the case, other therapeutic options should be considered. Based on these insights, we expect that ever more efforts will be invested in developing theranostic nanomedicines, and that these systems and strategies will contribute substantially to realizing the potential of personalized medicine.

Lammers, T. et al. (2012). "Drug targeting to tumors: Principles, pitfalls and (pre-) clinical progress." *J Control Release* 161(2):175–187.

Many different systems and strategies have been evaluated for drug targeting to tumors over the years. Routinely used systems include liposomes, polymers, micelles, nanoparticles, and antibodies, and examples of strategies are passive drug targeting, active drug targeting to cancer cells, active drug targeting to endothelial cells, and triggered drug delivery. Significant progress has been made in this area of research