Nanoscale drug delivery systems represent a new concept for delivering pharmaceuticals for increased efficacy and reduced side-effects. In this work focus our attention on the physical (size, surface area and charge) and chemical (composition, molecular weight) of nanoparticles, and how these properties alter release of chemotherapeutics from the nanoscale drug carrier.

**Introduction**
Utilization of nanoparticles for delivering pharmaceuticals is becoming more and more popular in academic and industrial research groups. Nanoparticles can be used to limit toxic side effects of chemotherapy and to direct the drug to the diseased tissue (e.g. tumor). Correctly designed, nanoparticles, especially those made from biocompatible or biodegradable polymers can accumulate in tumor tissue due to the enhanced permeation and retention effect (EPR). EPR can be seen in solid tumor masses with faulty or inefficient lymphatic system.

In this work we have focused our attention on the physical and chemical properties of shell crosslinked knedel-like (SCK) nanoparticles, and how these properties affect release of a common chemotherapeutic doxorubicin from the interior of the particle. SCK nanoparticles is a promising nanoscale scaffold for imaging, drug delivery, as well as theranostic applications due to their crosslinked nature that results increased stability and a lack of a critical micelle concentration (Fig 2).

In this paper we show that the amphiphilic core-shell morphology of the SCK nanostructures provided opportunities for tuning of the drug loading capacities and rates of release; increasing core diameters and core-shell interfacial surface areas were important for increased guest packaging capacity and decreasing proportions of shell-to-core volume was the critical parameter for increased kinetics of release (Fig 1).

Conclusion: As the relative proportion of shell to core volumes decreased, an increase in the rate and total release was increased. As these parameters can be tuned by polymer composition, SCK nanoparticles offer enormous opportunity for the production of nanoscopic drug carriers

![Figure 1. Release kinetics of doxorubicin from SCKs of different size.](image)

**Literature**