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Science Bridges China Research Profile

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Biomedical polymers for drug/gene delivery, tissue engineering and other biomedical applications

用于药物/基因传递、组织工程及其它生物医用领域的生物医用高分子

Primary Research interests:

Our primary research interests are focused on the functional peptides and polymers for drug and gene delivery. To endow the delivery systems with active targeting property, studies have been carried out on the incorporation of various targeting ligands including particular cell penetrating peptide sequences, RGD sequence, transferrin, galactose, and folate to drug and gene delivery systems through covalent bonds and biotin-avidin interaction. To endow the delivery systems with stimuli responsibility, we designed and prepared various types of nanoparticulate drug delivery systems with stimuli responsibilities including pH, temperature and light sensitivities etc. We authored more than 220 peer-reviewed papers and 6 patents.

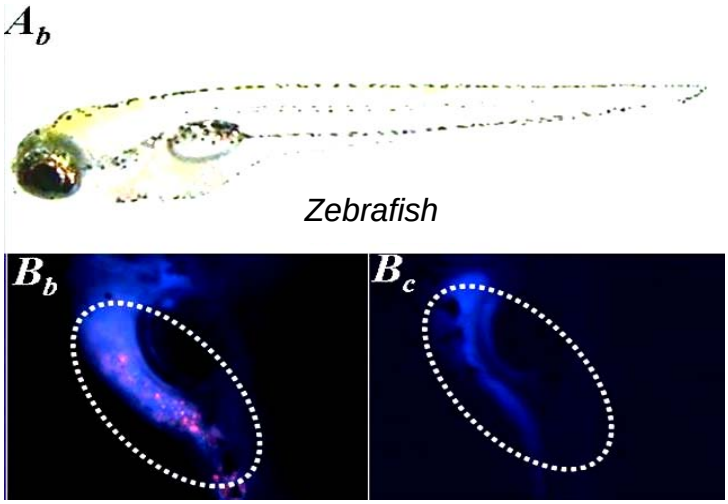
Topics in which you would like to develop collaborative research:

- **Drug delivery systems**
- **Gene delivery systems**
- **Polymers for tissue engineering**
- **Polymer design and synthesis**

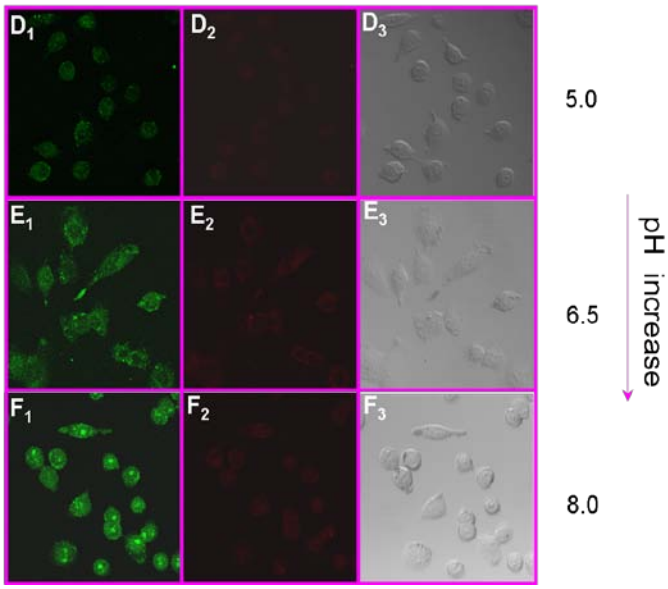
Selected Publications and Patents in this Programme

1. Feng J, Zhuo RX, **Zhang XZ.*** Construction of functional aliphatic polycarbonates for biomedical applications. *Prog. Polym. Sci.* 2012, 37, 211-236.
2. Wei H, Cheng SX, **Zhang XZ,*** Zhuo RX. Thermo-sensitive polymeric micelles based on poly(N-isopropylacrylamide) as drug carriers. *Prog. Polym. Sci.* 2009, 34, 893-910.
3. Xiao W, Chen WH, Li C, Zhang J, Zhuo RX, **Zhang XZ.*** Design of a cellular-uptake-shielding template for photo-controlled appointed drug release. *Adv. Mater.* 2011, 23, 3526-3530.
4. Chen JX, Wang HY, Li C, Han K, **Zhang XZ,*** Zhuo RX. Construction of surfactant-like tetra-tail amphiphilic peptide with RGD ligand for encapsulation of porphyrin for photodynamic therapy. *Biomaterials* 2011, 32, 1678-1684.
5. Li YY, Cheng H, Zhu JL, Yuan L, Dai Y, Cheng SX, **Zhang XZ,*** Zhuo RX. Temperature and pH sensitive multi-colored micellar complexes**.** *Adv. Mater.* 2009, 21, 2402-2406.
6. Dong HQ, Li YY, Cai SJ, Zhuo RX, **Zhang XZ,*** Liu LJ.* A facile one-pot construction of supramolecular polymer micelles from α-cyclodextrin and poly(ε-caprolactone) *via* noncovalent interaction**.** *Angew. Chem. Int. Ed.* 2008, 47, 5573-5576.
7. Chu CC., **Zhang XZ,** Wu DQ. Injectable hydrogel microspheres from aqueous two-phase system. *US Patent* 7,776,240.
8. Chu CC, **Zhang XZ.** Partially biodegradable temperature and pH sensitive hydrogel. *US Patent* 7,420,024.

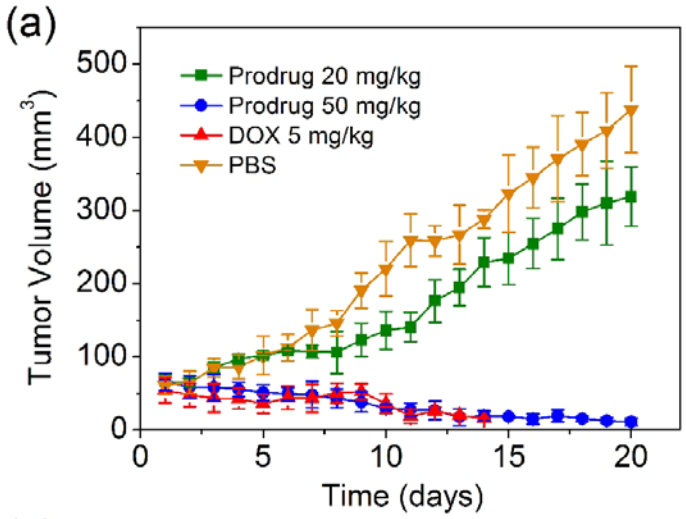
Various polymers/peptides were synthesized for biomedical applications

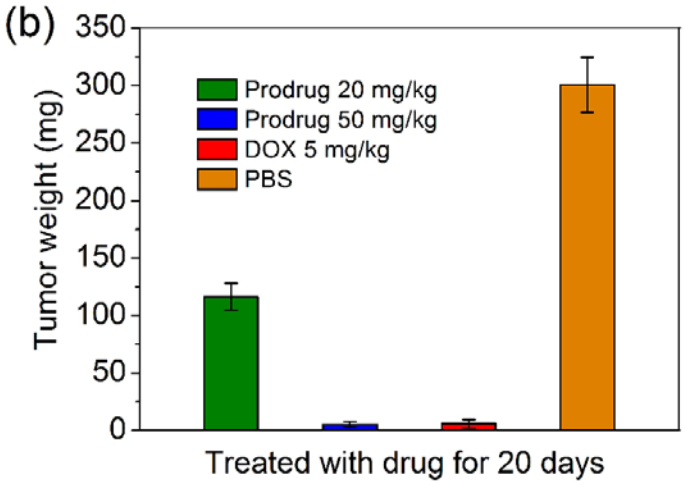


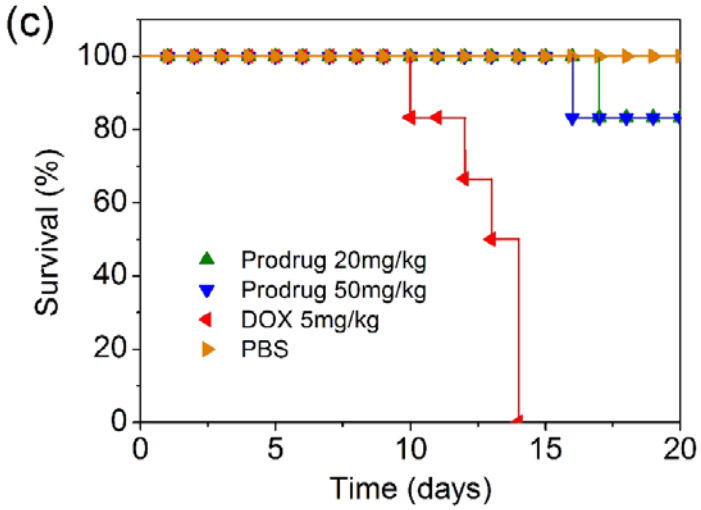
***In-vivo* Tracking** (ACS Nano 2008, 2, 125)

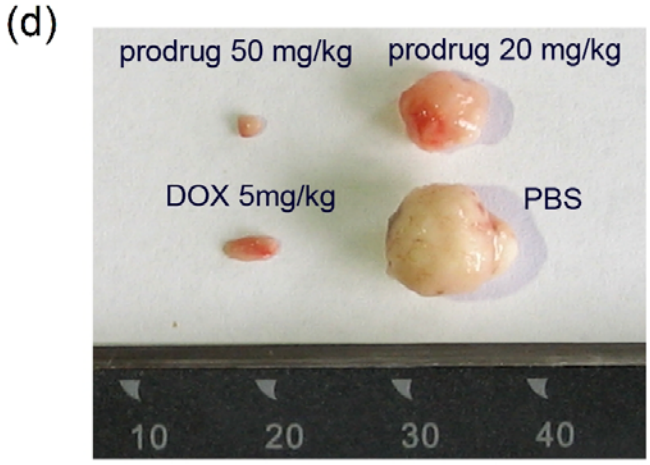


Biosensors based on intelligent micelles
(Adv. Mater. 2009, 21, 2402)









Anti-Tumor Effect: Inhibiting tumor (cervix neoplasm) growth *in vivo* (To be published)