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Enhanced *in vivo* angiogenic activity of FGF-2 by a [polycation:heparin] complex

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Introduction: Growth factors regulate essential cell functions including survival, self renewal, differentiation and proliferation and hold great potential for regenerative medicine. However, their limited half life compromises the clinical utility significantly. A suitable delivery vehicle can greatly increase the efficiency and efficacy of growth factor therapy. Heparin, a highly sulfated polysaccharide, has strong affinity to various growth factors. In order to maintain its native property and function, we used a polycation to interact with heparin electrostatically without any covalent modification to heparin. [1]We demonstrated high angiogenic efficacy of FGF-2 delivery using this strategy *in vivo*.

Materials and Methods: A biocompatible polycation, poly(ethylene argininylaspartate diglyceride) (PEAD), self assembled with heparin and FGF-2 to form a coacervate - [PEAD:heparin:FGF-2]. Prior *in vitro* studies demonstrated that [PEAD:heparin] complexcould encapsulate FGF-2 efficiently, control its release and maintain its bioactivity. [2]Here, saline, [PEAD:heparin], bolus FGF-2 (500 ng) or [PEAD:heparin:FGF-2] (500 ng FGF-2) was injected subcutaneously in the back of BALB/cJ mice. 1, 2 or 4 weeks post-injection, the animals were sacrificed. The tissues at the injection sites and the contralateral sites were harvested for hemoglobin quantification and immunohistological analysis to determine the extent of angiogenesis.

Discussion and Conclusions: Both qualitative and quantitative results demonstrate that [PEAD:heparin] coacervate is an excellent vehicle that greatly increases the angiogenic activity of FGF-2 over bolus injection. We are currently investigating the efficacy of this delivery platform in several disease models in an effort to translate this clinically.

Biography

Yadong Wang is an Associate Professor of Bioengineering at the University of Pittsburgh. He earned his PhD from Stanford University as a Veatch Fellow in 1999. He finished his postdoctoral training at MIT in 2002. His interests include bio-inspired materials for tissue engineering and regenerative medicine. His laboratory works at the interface of chemistry, materials science, and medicine. Dr. Wang's team applies minimalistic biomimetic strategies to biomaterials design and explores means to translate cutting-edge materials innovations into clinical benefits. He has published over 30 peer-reviewed articles in journals including Science, Nature Biotechnology, and PNAS.