BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
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NAME	POSITION TITLE
Joseph Anthoney Vetro	Assistant Professor
eRA COMMONS USER NAME VETRO.JOSEPH	

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Nebraska, Omaha, NE	BA	1996	Chemistry
Saint Louis University, Saint Louis, MO	PhD	2001	Biochem / Mol Biol
University of Kansas, Lawrence, KS	PD	2001-2004	Pharm Chem / Phys Chem

Personal Statement

The goal of the proposed research is to develop targeted nanocarriers for siRNA delivery to tumor vasculature. We propose to assess cell surface specificity of targeted polymer-based chol-siRNA nanocarriers under near-physiological conditions to select for targeting ligand modifications that are most likely to increase targeted siRNA delivery *in vivo*. I am currently an early stage investigator (ESI) broadly trained in chemistry, physical chemistry, and cell biology and have many years of experience with the formation, modification, purification, and characterization of targeted nanocarriers. This allows me to take a "big picture" approach to developing targeted nanocarriers and effectively communicate with my peptide chemist (Dr. Sanderson) and tumor biology (Dr. Singh) collaborators. I was previously awarded an R21 that allowed me to isolate the majority of the Immortomouse cells that will be used in this proposal as well as identify a promising polymer candidate for use with 3' cholesterol-modified siRNA. I currently have two research technicians and three graduate students in my lab to directly or indirectly support the work requirements of this proposal. I manage the group through monthly lab meetings as well as bi-weekly reports summarizing experimental data, protocols, observations, current work, and future directions. I communicate with my collaborators at least once a month and report any issues or observations that come up as needed. In summary, I have the expertise, experience, resources, and ideal environment necessary to lead the proposed project.

Positions and Honors

Positions and Employment

02/08 – Pres Assistant Professor, Department of Pharmaceutical Sciences

07/04 – 02/08 Research Assistant Professor, Department of Pharmaceutical Sciences
University of Nebraska Medical Center, Omaha, NE

10/04 – Pres Member, Center for Drug Delivery and Nanomedicine, University of Nebraska Medical Center, Omaha, NE

11/04-Pres Associate Member, UNMC Eppley Cancer Center, University of Nebraska Medical Center, Omaha, NE

Honors & Awards

2002-2004 American Heart Association Post-Doctoral Fellowship (0225425Z)

- *Generation of Novel Cationic Polymers for Gene Delivery to Vascular Endothelial Cells Using a Combinatorial Approach*

2000-2001 American Heart Association Pre-Doctoral Fellowship (0010163Z)

- *Intracellular Role of the Type 1 and Type 2 Methionine Aminopeptidase N-Terminal Domains*

Publications (in chronological order)

1. (2010) Ambardekar VV, Han H-Y, Varney ML, Vinogradov SV, Singh RK, **Vetro JA**. "The Modification of siRNA with 3' Cholesterol to Increase Nuclease Protection and Suppression of Native mRNA by Select siRNA Polyplexes". Biomaterials, doi:10.1016/j.biomaterials.2010.10.019
2. (2009) Kakiuci-Kiyota S, **Vetro JA**, Suzuki S, Varney ML, Han H-Y, Nascimento M, Pennington KL, Arnold LL, Singh RK, Cohen SM. Evaluation of Effects of Troglitazone on Endothelial Cells in vivo and in vitro: Differences Between Mouse and Human. Toxicol Appl Pharmacol. 237: 83-90.
3. (2006). **Vetro JA**. Delivery, detection, and development in nanomedicine. Nanomedicine. 1(4): 487-489.
4. (2006) Batrakova EV, Bronich TK, **Vetro JA**, Kabanov AV. "Polymeric Micelles as Drug Carriers" in Nanoparticulates as Drug Carriers, Ed. Torchilin, V., Imperial College Press: London, UK. 57-93.
5. (2005) Braun CS, **Vetro JA**, Koe GS, Koe JG, Tomalia DA, and Middaugh CR. Structure/function relationships of polyamidoamine/DNA dendrimers as gene delivery vehicles. J Pharm Sci. 94(2): 423-436.
6. (2005) **Vetro JA**, Dummitt B, Micka WS, and Chang YH. Evidence of a dominant negative mutant of yeast methionine aminopeptidase type 2 in Saccharomyces cerevisiae. J Cell Biochem. 94: 656-668.
7. (2004) **Vetro JA**, Dummitt B, and Chang YH. "Methionine aminopeptidase: Emerging role in angiogenesis" in *Aminopeptidases in Biology and Disease*, Eds. Hooper NM and Lendeckel U, Kluwer: New York, New York. 17-44.
8. (2003) Lobo BS, **Vetro JA**, Suich DM, Zuckermann RN, and Middaugh CR. Structure/functional analysis of peptoid/lipitoid:DNA complexes. J Pharm Sci. 92 (9): 1905-1918.
9. (2002) **Vetro JA** and Chang YH. Yeast methionine aminopeptidase type 1 is ribosome-associated and requires its N-terminal zinc finger domain for normal function in vivo. J Cell Biochem. 85: 678-688.
10. (2002) Chen S, **Vetro JA**, and Chang YH. The specificity *in vivo* of two distinct methionine aminopeptidases in Saccharomyces cerevisiae. Arch Biochem Biophys. 398(1): 87-93.

Research Support

Current Research Projects

"Targeted Nanocarrier for siRNA Delivery to Tumor Vasculature"
Role: Project Leader
Agency: NIH (R021937-01A2)
Type: COBRE
Period: 9/01/08-10/31/11

The objective of these studies is to develop core cross-linked polyionic block copolymer micelles for the targeted systemic delivery of small interfering RNA (siRNA) to activated breast MVEC in order to inhibit breast tumor angiogenesis and subsequent breast tumor growth.

Completed Research Projects (Last 3 years)

"Development of Targeted Nanogels for siRNA Delivery to Tumor Vasculature"
Role: Primary Investigator
Agency: NIH (5 R21 EB005683-02)
Type: Exploratory / Developmental Research Grant
Period: 07/01/07-06/30/10

The objective of these studies is to develop PEI-*cl*-PEG homopolymer Nanogels for the targeted systemic delivery of small interfering RNA (siRNA) to activated MVEC in order to inhibit tumor angiogenesis and subsequent tumor growth.

"Development of Targeted Nanogels for the siRNA-Mediated Anti-Angiogenesis Treatment of Breast Cancer"
Role: Primary Investigator
Agency: Department of Defense Breast Cancer Research Program 2005 Concept Award (#BC053471)

Type: Research, Seed Grant
Period: 08/07/2006-8/07/2007

The objective of these studies is to develop more efficient targeted drug delivery vehicles for siRNA delivery to breast tumor vasculature.

“Targeted Nanogels for the siRNA Treatment of Skin Cancer”
Role: Primary Investigator
Agency: Nebraska Health and Human Services (#2007-41)
Type: Research, Seed Grant
Period: 07/01/2006-06/30/2007

The objective of these studies is to develop more efficient targeted drug delivery vehicles for the siRNA-mediated treatment of skin cancer.