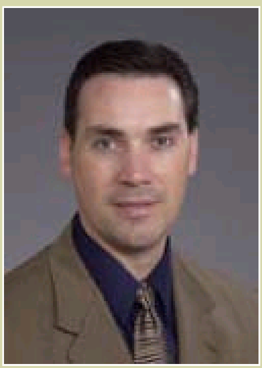

Associate Professor
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EDUCATION:

- B.S., Central Michigan University, Mt. Pleasant, MI, 1988
- Ph.D., University of Cincinnati, Cincinnati, OH, 1998

RESEARCH INTERESTS:

Biomaterials Development - Mark E. Van Dyke, Ph.D.
Biomaterials are an essential tool in regenerative medicine that provide the basis for growing and delivering cells, developing functional tissues, and engineering whole organs. At the Wake Forest Institute for Regenerative Medicine, we focus on replicating the native cellular environment to facilitate normal development of engineered tissues and organs. We emphasize the use of "intelligent" scaffolds that are able to interact with the cells of interest and direct the development of vascularized, innervated, functional tissues. Research conducted by Mark Van Dyke, Ph.D. makes use of naturally-derived structural proteins for biomaterials development. Using proteins such as collagen and keratin, Dr. Van Dyke creates matrices and scaffolds used for the regeneration of several tissue types. In the keratin system, proteins are purified from end-cut human hair and demonstrate several remarkable characteristics. First, keratins are highly biocompatible because they come from human tissue. Purified samples contain no cellular material so they do not elicit an immune response between individual donors. Second, certain keratins have an incredible ability for molecular self-assembly that results in the spontaneous formation of network structures. Self-assembly occurs on the nanometer scale and builds to the micron scale, resulting in homogenous, porous architectures that are conducive to growing tissues. Third, keratin proteins contain cellular-binding motifs that mimic the sites of cell attachment found in the native extracellular

> Home > People
> Faculty
> Primary Faculty
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> Devita, Raffaella
> Duma, Stefan
> Freeman, Joseph
> Gabler, Clay
> Ge, Yaorong
> Goldstein, Aaron
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> Hamilton, Craig
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> Harrison, Benjamin
> Holzbaur, Katherine
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> Lockhart, Thurmon
> Madigan, Michael
> Munley, Michael
> Nussbaum, Maury
> Rajagopalan, Padma
> Rylander, Christopher
> Rylander, Nichole
> Santago, Pete
> Saul, Justin
> Socha, Jake
> Soker, Shay
> Sparks, Jessica
> Staples, Anne
> Stitzel, Joel
> Van Dyke, Mark
> Vlachos, Pavlos
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> Wyatt, Chris
> Yoo, James

matrix. By leveraging these unique characteristics, we are creating inexpensive biomaterials for a host of biomedical applications. Our current research programs are focused on the use of keratin biomaterials for skin regeneration in acute full thickness wounds such as burns, scaffolds for guided nerve regeneration, and bone graft substitutes for healing contaminated sites of injury. Collaborating Departments include Orthopaedic Surgery, Plastic and Reconstructive Surgery, Molecular Medicine, and Biomedical Engineering.

RECENT PUBLICATIONS :

- Sierpinski P, Garrett J, Ma J, Apel P, Klorig D, Smith T, Koman LA, Atala A, Van Dyke M. The use of keratin biomaterials derived from human hair for the promotion of rapid regeneration of peripheral nerves. Biomaterials 2007 (in press)

- Furth ME, Atala A, Van Dyke ME. Smart biomaterials design for tissue engineering and regenerative medicine. Biomaterials. 2007 (in press)

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