UNDERGRADUATE RESEARCH AT GEORGIA TECH

Pete Ludovice

CHBE
Looks more complicated than it is.
Magainin-Mediated Disruption of Stratum Corneum Lipid Vesicles

Shilpa Kaushik, Arthi Krishnan, Mark R. Prausnitz, and Peter J. Ludovie

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KEY WORDS: magainin; stratum corneum; liposome; lipid bilayer; transdermal drug delivery.

INTRODUCTION

Drug delivery across the skin has had great success for drugs such as nicotine, estradiol, and a few others (1,2). However, the vast majority of drugs cannot cross skin at therapeutic rates, due primarily to the formidable barrier presented by skin’s outer layer, the stratum corneum. This barrier to transdermal transport is formed primarily by a series of multilamellar lipid bilayers found in stratum corneum’s extracellular...

contain fewer zwitterionic phospholipids (~5 wt. %) than typical eukaryotic cells, while containing ~16 wt. % negatively-charged fatty acids (8). Given the significant negative charge and limited zwitterion content of stratum corneum, we propose the hypothesis that magainins can disrupt stratum corneum lipid bilayers.

MATERIALS AND METHODS

Materials

Cholesterol, cholesterol sulfate, palmitic acid, calcein, and ceramides (non-hydroxy fatty acid, prepared by treating bovine brain sphingomyelin with phospholipase C) were purchased from Sigma (St. Louis, MO), methanol from Fisher Scientific (Fair Lawn, NJ) and chloroform from J. T. Baker (Phillipsburg, NJ). The Tris / EDTA / NaCl buffer (pH 7.4) contained 10 mM Tris, 150 mM NaCl, and 0.1 mM EDTA (Sigma). The phosphate-buffered saline (PBS; pH 7.4) contained 10 mM phosphate buffer, 2.7 mM potassium chloride, and 137 mM sodium chloride (Sigma).

Magainin peptides were synthesized using a PE-Biosystems (Foster City, CA) model 433A peptide synthes...
Experimental Research
Computational Research

Helical Regions

Kinks
Why Do Research?

- Find out if you like research
- Find out if a thesis graduate degree is for you
- Add to your resume for graduate school (2 different ways...)
- Fulfill various technical requirements and electives
- Its more fun than class...
Experimental Gaming Lab
Non-Traditional Projects
How It Works

- Project usually motivated by faculty
- Can be done for credit (9 hours of work and 3 credit hours)
- Can be done for pay
- You may report to faculty, post-docs or graduate students
- Do at least 2 semesters
- Typically done after sophomore year
Have your OWN idea that can be developed?

www.inventureprize.gatech.edu
For whom are you working?
How to Get Started?

• Figure out what you want to do
• Go to the Web to find research area
• Look to see how research credit counts toward requirements, electives, minor and certificates
• Send resume and inquiry to targeted faculty
• MEET the faculty member, ask questions!!!!!
• Try to clear 2 semesters for research, if possible
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**School Web Sites**
ECE Faculty Members Sorted by Technical Interest Group

Bioengineering

Bhati, Pamela T
Brand, Oliver
Butera, Robert J
Clements, Mark A
DeWeerth, Stephen P
Frazier, Albert B
Ghovanloo, Maysam
Hunt, William D
Kobla, Arthur, Chair
Rozell, Christopher John
Tannenbaum, Allen R
Vachsevano, George
Wu, Hongwei
Zhou, Guoliang

Computer Engineering

Ablay, Randal T
Anderson, David V
Blough, Douglas M
Butera, Robert J
Chatterjee, Abhijit
Davis, Jeffrey A
Feni, Bonnie Heck
Harnblen, James O
Hastler, Paul E
Heng, Bo
Hughes, Joseph L A
Javant, Nikil S
Keeler, David C
Kim, Jeongman
Lee, Hsien-Hsin Sean
Lim, Sung-Kyu
Madisetti, Vijay K
McClelland, James H
Mooney, Vincent J
Mukhopadhyay, Saibal
Owen III, Henry L
Riley, George F
Schimmel, David E
Slub, Gordon L
Swaminathan, Madhavan
Tummal, Rao R
Wills, Donald Scott
Wills, Linda M
Yalamanchili, Suchakar, Chair
Yezzi, Anthony Joseph

Digital Signal Processing

School Listings by Research Area
Interdisciplinary Centers: Nanotech
Georgia Tech's Bioengineering program is an interdisciplinary graduate program offering advanced courses in bioengineering, engineering specialties, and life sciences combined with hands on cutting-edge research. Bioengineering research focuses on the development of new or improved physical and mathematical concepts and techniques which may be applied to problems in medicine and biology, including the fundamental study of biological phenomena and the development of new medical devices. There are currently over 170 graduate students in the program.

The participating academic units consist of nine schools within the College of Engineering as well as the College of Computing. Over 90 faculty from across the Colleges of Engineering, Sciences, and Computing participate in the program.

PROSPECTIVE STUDENTS
PhD Degree, MS Degree, BS/MS Option, How to Apply, FAQ, Handbook, About Atlanta

CURRENT STUDENTS
Handbook, BGSAC, BUGS, Qualifying Exams, Upcoming Dates & Deadlines

GENERAL INFORMATION
Overview, Faculty Listing, Committees, History, Program, Faculty, Contact Us

UPCOMING EVENTS
- Sharon Norman - Ph.D. Proposal, February 18th, 2009
- Bioengineering Program Faculty Meetings
- Bioengineering Graduate Committee Meetings

IN THE NEWS
- Dr. Robert Butera - Receives Jefferson Science Fellow Award
- Dr. Xiaoping Hu Finds Simple Way to Make Mammalian Cells Have Magnetic Signature
- Dr. Todd McDevitt's Research Highlighted in Nature Materials
- Dr. Andres Garcia's Research published in PNAS
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