BIOGRAPHICAL SKETCH

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NAME: Edward Kwasi Agyare

eRA COMMONS USER NAME (credential, e.g., agency login): eagyare

POSITION TITLE: Associate Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Science & Technology, Ghana	BS	05/1998	Biochemistry
University of Science & Technology, Ghana	MS	05/2005	Clinical Biochemistry
Mayor Clinic Graduate School, Rochester, MN	Visiting Fellow	10/2010	Dept. of Neurology
Florida A&M University, Tallahassee, FL, USA	Ph.D.	04/2011	Pharmaceutics
MD Anderson Cancer Center, Houston TX, USA	Postdoctoral	08/2012	Radiation Oncology
MD Anderson Cancer Center, Houston TX, USA	Visiting Scientist	12/2014	Radiation Oncology

A. Personal Statement

My laboratory works with a variety of nanoparticles for imaging and chemotherapy. I have previously loaded Magnevist®, a contrast agent, into liposomal nanoparticle for magnetic resonance imaging (MRI) of pancreatic cancer *in vivo* and performed the first comprehensive biodistribution and pharmacokinetics analysis of such a nanoprobe. I have also developed techniques to enhance the signal-to-noise ratio of tumor-imaging using such nanoprobes. My previous work with drug delivery system has focused extensively on using gemcitabine loaded-thermosensitive liposomal nanoparticle mediated hyperthermia to sensitize tumors to gemcitabine and defined a novel dual mechanism of action involving anti-hypoxic and vascular disrupting properties of this approach. In anticipation of clinical translation of this paradigm, my laboratory is currently developing a theranostic nanoparticle that combines Magnevist® and modified gemcitabine as one unit that would have the ability to detect and suppress pancreatic tumor growth. I have successfully collaborated with leading investigators in my area of research, and produced several peer-reviewed publications.
With my research career of 6 years, I have trained and graduated 2 PhD students who are gainfully employed. Currently, I am expertly training 3 PhD students and 1 postdoctoral fellow in my lab.
As a PI of full project 2 on NIH/NCI funded U54 Comprehensive Partnerships to Advance Cancer Health Equity (CPACHE), I have the leadership, training, expertise and motivation necessary to successfully complete the project that focus on the sequencing of pancreatic cancer genome from American Africans, Hispanics and Caucasians and identify therapies or modified existing chemotherapy drugs that are relevant to treatment of a particular pancreatic cancer patient.

Peer reviewed publications highlighting experience and qualifications for this project

a. Agyare EK, Jaruszewski KM, Curran GL, Rosenberg JT, Grant SC, Lowe VJ, et al. Engineering theranostic nanovehicles capable of targeting cerebrovascular amyloid deposits. J Control Release. 2014;185:121-9. PubMed PMID: 24735640.
b. Affram K, Udofot O, Singh M, Krishnan S, Reams R, Rosenberg J, et al. Smart thermosensitive liposomes for effective solid tumor therapy and in vivo imaging. PLoS One. 2017;12(9):e0185116. PubMed PMID: 28934281.

B. Positions and Honors

Positions and Employment

09/2019 – Present: Vice Division Director, Pharmaceutical Sciences, College of Pharmacy and Pharmaceutical Sciences. Tallahassee, Florida

08/2017 – Present: Associate Professor, Division of Pharmaceutical Sciences, College of Pharmacy and Pharmaceutical Sciences. Tallahassee, Florida

08/2012 – 08/2017: Assistant Professor, Division of Pharmaceutical Sciences, College of Pharmacy and Pharmaceutical Sciences. Tallahassee, Florida

09/2013 – 12/2014: Visiting Scientist, The University of Texas MD Anderson Cancer Center, Houston, Texas

2011-2012 Postdoctoral fellow, Dept. of Radiation Oncology, MD Anderson Cancer Center, Houston, TX

2008-2010 Visiting Fellow, Department of Neurology, Mayo Clinic Graduate School, Rochester, MN

2005-2011 Graduate Teaching Assistant, College of Pharmacy and Pharmaceutical Sciences, Florida A&M University, Tallahassee Florida

Other Experience

2019 NIH, NCI Innovative Research in Cancer Nanotechnology (R01) ZRG1 IMST-K (55)R study section, ad hoc Reviewer

2018 NIH, NCI Developmental Therapeutics (DT) study section (R01/R21), ad hoc Reviewer

2017 Florida Department of Health's Ed and Ethel Moore Alzheimer's Disease Research Program, ad hoc grant reviewer

2017-2018 American Association of Colleges of Pharmacy New Investigator Award (Pharmaceutics Section) Grant, Reviewer

2017 - AAPS Poster Abstract, Reviewer

2011- American Association for Cancer Research (AACR), Member

2008-09 AAPS Florida A&M University Students' Chapter, Chair

2006- American Association of Pharmaceutical Scientists (AAPS), Member

2002- 2010 American Association for Clinical Chemistry (AACC), Member

Honors

2002 Recipient, AACC Travel Grant Award, Orlando, FL

2005 Recipient, AACC Travel Grant Award, Orlando, FL

2007 Recipient, Best Poster Award Presentation, Annual Graduate Students Research Association in Pharmaceutical Sciences. The Rutgers University, New Jersey

2009 Leadership Award, College of Pharmacy and Pharmaceutical Sciences, Florida A&M University

2010 Recipient, Best Poster Presentation- Nanoscience, Florida A&M University Annual Research Forum

2010 Recipient, AAPS Graduate Student Award in Biotechnology, New Orleans, LA

2011 Recipient, Dr. Israel Tribble, Jr. Award for Excellent Academic Knowledge and Commitment to Enhance the African American Community. College of Pharmacy Pharmaceutical Sciences, Florida A&M University

2013-14 Recipient, Teacher of the Year Award, Division of Basic Pharmaceutical Sciences, College of Pharmacy and Pharmaceutical Sciences, Florida A&M University

2016-17 Recipient, Teacher of the Year Award, Division of Basic Pharmaceutical Sciences, College of Pharmacy and Pharmaceutical Sciences, Florida A&M University

C. Contributions to Science

My contributions focus on the effective approach to outsmart or overcome the barriers posed by blood- brain barrier (BBB) in the delivery of diagnostic and therapeutic agents to central nervous system (CNS) for detection and treatment of brain disorders especially cerebral amyloid angiopathy (CAA) and Alzheimer's disease (AD). Currently there are no reliable methods for diagnosis and treatment of patients with CAA or AD, they are largely identify base on their behavioral pattern such as cognitive impairment or vascular dementia. My studies emphasized on: i) critical factors that

promotes CAA and AD, and ii) the designed, development and delivery of targeted nanoparticles containing cyclophosphamide and magnetic resonance imaging (MRI) that is capable of early detection of amyloid protein aggregates in the cerebral vasculature or fibril formation in neurons and also reduce aggressive vascular inflammation associated with CAA. This body of information adds to the body of existing knowledge to advance science in the area of drug delivery to diagnosis and treat brain disorders.

a) Edward Agyare, Geoffry Curran, Muthu Ramakrishnan, Caroline Wu, Joseph F. Poduslo, Karunya K.Kandimalla. Development of a Smart Nano-vehicle to Target Cerebrovascular Amyloid Deposits and Brain Parenchymal Plaques Observed in Alzheimer's disease and Cerebral Amyloid Angiopath. *Pharmaceutics Research*, 2008, **25**:2674-84 PMID. 18443900
b) Edward Agyare, Sarah R. Leonard, Geoffry Curran, Anant Paravastu, Val Lowe, Caroline Yu, Joseph Poduslo, Karunya Kandimalla. Alzheimer 's disease amyloid β protein traffic jam at the blood brain barrier: *Molecular Pharmaceutics* 2013,**10**:1557-1565.PMC 3756545, PMID 23249146
c) Edward Agyare, Kristen Jaruszewski, Geoffry Curran, Jens Rosenberg, Samuel Grant, Val Lowe, Subramanian Ramakrishnan, Anant K. Paravastu, Joseph F. Poduslo, Karunya K. Kandimalla: Engineering Theranostic Nanovehicles Capable of Targeting Cerebrovascular Amyloid Deposits. *Journal of Controlled Release*, 2014, 185:121-129 PMID 24735640

Conclusion: With the knowledge acquired in drug delivery based on novel techniques above to address issues of nanoparticles penetration of the blood brain barrier, I teamed up with collaborators to work on: i) tumor imaging and, ii) increase penetration of anticancer drugs in tumors. Our publications focused on the feasibility of using mild hyperthermia as modality to sensitize pancreatic tumor to gemcitabine, a preferred drug of choice use in treating patients with pancreatic cancer.
This body of work discusses the entrapment of gemcitabine in nanoparticles to prevent rapid systemic clearance the anticancer drug and play a crucial role of sensitizing patient-derived pancreatic cancer to modified existing anticancer drugs such as gemcitabine.

Complete List of Published Work in MyBibliography:
http://www.ncbi.nlm.nih.gov/sites/myncbi/1T_thnr9Yk4QL/bibliograpahy/47984537/public/?sort=date&direction=ascending

D. Research Support and/or Scholastic Performance

Ongoing Research Support

NIH-NCI 1U54CA233396-01 (Agyare, E) 09/19/2018 - 08/30/2021 $787,434
Full Project 2 Title: Enhancing efficacy of gemcitabine nanoparticles in pancreatic cancer patient-derived xenograft tumor model
Goal is to use molecular profile to predict the sensitivity of pancreatic cancer in Black patients to determine more effective therapeutic regimens.

NIH-NCI P20CA192990-03 (Reams, R.R.) 09/01/2016 - 08/30/2019 No-cost extension
Florida Minority Cancer Research & Training Center: $692,088
Feasibility Studies (1 of 2)
Role on Project: E. Agyare: Pilot Project Investigator
Pilot Project Title: Enhancing efficacy of gemcitabine nanoparticles in pancreatic cancer patient-derived xenograft tumor model. **The goal** is to assess the role of hyaluronidase in improving gemcitabine penetration in tumor

COMPLETED:
NIH-G12MD007582 (Soliman, K.) 04/01/2015 - 03/31/2016
Pharmaceutical Research Center $2,331,310
Administrative Core: Faculty Development Program
Role on Project: Pilot Project Investigator
Pilot Project Title: Enhancing permeation of gemcitabine in pancreatic tumor by disruption of tumor hyaluronan. Goal: To improve the delivery of gemcitabine to pancreatic tumor by degrading hyaluronan using hyaluronidase.

The overall objective of this program is to strengthen the biomedical research capabilities of Florida A&M University and to facilitate its entry in mainstream funding from the NIH and other extramural agencies.

NIH-G12MD007582 (Soliman, K.) 04/01/2014 - 03/31/2015
Pharmaceutical Research Center $2,331,310
Administrative Core: Faculty Development Program
Role on Project: Pilot Project Investigator
Pilot Project Title: Deep penetration of liposome loaded gemcitabine for pancreatic cancer therapy.
Goal: To increase the stability of gemcitabine in vivo.
The overall objective of this program is to strengthen the biomedical research capabilities of Florida A&M University and to facilitate its entry in mainstream funding from the NIH and other extramural agencies.

NIH- U54MD008149 (Agyare, E.) 04/01/2013 - 03/30/2014
Charles R. Drew University RTRN $50,000
Small Grants Program – Subaward 13-14-MB-G007RNOA-FAMU-EA
Enhanced Permeation of thermosensitive liposomal nanoparticles into solid tumors
Goal: To assess the role of mild hyperthermia in sensitizing pancreatic cancer cells to gemcitabine and rapturing thermosensitive PEGylated liposome in tumor.