BIOGRAPHICAL SKETCH

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NAME: **FERNANDO ARIAS-MENDOZA, MD, PHD**

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

DRAFT

POSITION TITLE: **ADJUNCT ASSOCIATE PROFESSOR OF RADIOLOGY**

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
National University of Mexico	M.D.	1981	Medicine
National University of Mexico	M.S.	1987	Biochemistry
Yale University, New Haven CT, USA	Postdoctoral	1982-1986	Biophysics
National University of Mexico	Ph.D.	1990	Biochemistry
National Counsel in Human Genetics (Mexico)	Specialty	1990	Medical Genetics

A. PERSONAL STATEMENT

I am highly proficient in the biomedical applications of magnetic resonance (MR) technology working in this field for more than 20 years. I am highly knowledgeable in creating and managing research projects involving humans and experimental animals as subjects of research from conception to completion including multi-institutional trials and have been successful in obtaining peer-reviewed funding. I also have ample teaching experience in the fields of Biochemistry and the biomedical applications of MR technology and have trained young professionals in my trade. My overall objective is the application of MR technology to the study of humans in health and disease, focusing preferentially in cancer. MR technology measures some subcellular variables (biomarkers) noninvasively. My present goal is to assess in tumors if these MR-visible biomarkers show a significant relationship with treatment outcome. If I establish a relationship, then these biomarkers can be used to properly risk-assign cancer therapy with the potential to increase therapeutic success rates helping resolve the critical need to assign reliably cancer treatment.

B. POSITIONS AND HONORS

Positions and Employment

1976-1979 Teaching Assistant in Biochemistry, Medicine School, National University of Mexico, Mexico
1981-1982 Research Scientist, School of Medicine, National University of Mexico, Mexico
1984-1985 Visiting Researcher, Chemistry Department, Weizmann Institute of Science, Israel
1988-1989 Lecturer in Inborn Errors of Metabolism, National Institute of Pediatrics, Mexico City, Mexico
1980-1990 Lecturer in Biochemistry, Medicine School, National University of Mexico, Mexico
1986-1990 Head, Inborn Errors of Metabolism Service, Natl. Institute of Pediatrics, Mexico City, Mexico
1990-1991 Head, Inborn Errors of Metabolism Service, General Hospital of Mexico City, Mexico
1991-1997 Associate Research Scientist, NMR & Medical Spectroscopy, Fox Chase Cancer Center, USA
1997-2001 Staff Scientist, NMR & Medical Spectroscopy, Fox Chase Cancer Center, USA
2001-2010 Associate Research Scientist, Radiology Department, Columbia University, USA
2004-2014 Lecturer in Principles of Magnetic Resonance, Columbia University, New York NY, USA
2010-2014 Associate Professor of Radiology (Physics), Columbia University Medical Center, USA
2011- Adjunct Associate Professor of Radiology, University of Pennsylvania Health System, USA

Other Experience and Professional Membership

1980-1982 Coordinator, Undergraduate Examinations in Biochemistry, Natl. University of Mexico, Mexico
1982-1990 Member, Editorial Committee for the Biochemistry Objectives, Natl. University of Mexico, Mexico
1984- Member, International Society of Magnetic Resonance in Medicine, San Francisco CA, USA
1986- Member, Mexican Biochemical Society, Mexico City, Mexico
1987- Member, Mexican Association of Physiological Sciences, Mexico City, Mexico
1988- Member, Mexican Association of Human Genetics, Mexico City, Mexico

2003-2014 Member, Herbert Irving Comprehensive Cancer Center, New York NY, USA
2014- Member, American Association for Cancer Research, Philadelphia PA, USA

Honors (Awards, Fellowships)

1980 Honors Diploma, Exceptional Internship Performance, General Hospital of Mexico City, Mexico
1986 Repatriation Award, Mexican Foundation for Health, Mexico City, Mexico
1990 Annual Scientific Award, Mexican Association of Human Genetics, Mexico City, Mexico
2007 CTSA Pilot Award, Herbert Irving Cancer Center, Columbia University, New York NY, USA
2008 CTSA Pilot Award, Herbert Irving Cancer Center, Columbia University, New York NY, USA
2010 Travel Stipend Award, Radiological Society of North America, Oak Brook, IL, USA
2011 Herbert M. Stauffer Award, Association of University Radiologists, Oak Brook, IL, USA

C. CONTRIBUTION TO SCIENCE

My most important research contribution is the substantiation of the prediction of outcome by the pretreatment tumor value of phosphomonoesters in lymphoma patients. I am now working on improving this prediction and setting up an interventional trial to modify treatment based on the biomarker.

1. Ochs MF, Stoyanova RS, Arias-Mendoza F, *et al.*: A new method for spectral decomposition using a bilinear Bayesian approach. J Magn Reson 137:161-76, 1999 (PMID 10053145).
2. Franks S, Smith M, Arias-Mendoza F, *et al.*: Phosphomonoester concentrations differ between chronic lymphocytic leukemia cells and normal human lymphocytes. Leuk Res 26:919, 2002 (12163053)
3. Shukla-Dave A, Poptani H, Loevner LA, *et al.*: Prediction of treatment response of head and neck cancers with P-31 MR spectroscopy from pretreatment relative phosphomonoester levels. Acad Radiol 9:688-94, 2002 (12061743).
4. Arias-Mendoza F, Brown TR: In vivo measurement of phosphorous markers of disease. Dis Markers 19:49-68, 2003-2004 (PMID 15096705).
5. Arias-Mendoza F: In vivo magnetic resonance spectroscopy in the evaluation of mitochondrial disorders. Mitochondrion 4:491-501, 2004 (PMID 16120408).
6. Arias-Mendoza F, Smith MR, Brown TR: Predicting treatment response in non-Hodgkin's lymphoma from the pretreatment tumor content of phosphoethanolamine plus phosphocholine. Acad Radiol 11:368-76, 2004 (PMID 15109009).
7. Arias-Mendoza F, Zakian K, Schwartz A, *et al.*: Methodological standardization for a multi-institutional in vivo trial of localized (31)P-MR spectroscopy in human cancer research. In vitro and normal volunteer studies. NMR Biomed 17:382, 2004 (PMID 15386624)
8. Robinson JN, Cleary-Goldman J, Arias-Mendoza F, *et al.*: Detection of fetal lactate with two-dimensional-localized proton magnetic resonance spectroscopy. Obstet Gynecol 104:1208-10, 2004 (PMID 15516455).
9. Arias-Mendoza F, Payne GS, Zakian KL, *et al.*: In vivo ^{31}P MR spectral patterns and reproducibility in cancer patients studied in a multi-institutional trial. NMR Biomed 19:504-12, 2006 (PMID 16763965).
10. Coon AL, Arias-Mendoza F, Colby GP, *et al.*: Correlation of cerebral metabolites with functional outcome in experimental primate stroke using in vivo ^{1}H-magnetic resonance spectroscopy. AJNR Am J Neuroradiol 27:1053-8, 2006 (PMID 16687542).
11. Freda PU, Shen W, Reyes-Vidal CM, *et al.*: Skeletal muscle mass in acromegaly assessed by magnetic resonance imaging and dual-photon x-ray absorptiometry. J Clin Endocrinol Metab 94:2880-6, 2009 (PMID 19491226).
12. Sonabend AM, Stuart RM, Yun J, *et al.*: Prolonged intracerebral convection-enhanced delivery of topotecan with a subcutaneously implantable infusion pump. Neuro-Oncology 13:886-93, 2011 (PMID 21750007).
13. Lee S-C, Arias-Mendoza F, Poptani H, *et al.*: Prediction and early detection of response by NMR spectroscopy and imaging. PET Clin 7:119-126, 2012 (PMID 22737093).
14. Arias-Mendoza F, Payne GS, Zakian K, *et al.*: Noninvasive Phosphorus Magnetic Resonance Spectroscopic Imaging Predicts Outcome to First-line Chemotherapy in Newly Diagnosed Patients with Diffuse Large B-Cell Lymphoma. Acad Radiol 20:1122-9, 2013 (PMID 23931426).
15. Garcia-Diaz B, Garone C, Barca E, *et al.*: Deoxynucleoside stress exacerbates the phenotype of a mouse model of mitochondrial neuro gastrointestinal encephalopathy. Brain 137:1337-49, 2014 (PMID 24727567).

URL FOR A FULL LIST OF PUBLISHED WORKS

http://www.ncbi.nlm.nih.gov/sites/myncbi/fernando.arias-mendoza.1/bibliography/43729601/public/?sort=date&direction=descending

D. RESEARCH SUPPORT

PAST GRANT SUPPORT

IN VIVO MURINE LIVER METABOLISM STUDIES WITH NMR AT 9.4 TESLA

PUIC-02 (Arias-Mendoza, F) 09/01/82-08/30/85 Principal Investigator
National University of Mexico, Mexico International Training Federal Grant
Assessment of liver metabolism on the isolated perfused live mouse liver by ^{13}C, ^{31}P, and ^{1}H MRS at 9.4 T.

IN VIVO MURINE LIVER METABOLISM STUDIES WITH NMR IN A LARGE BORE MAGNET AT 2.0 TESLA

1F05TW03346 (Arias-Mendoza, F) 09/01/83-08/30/85 Principal Investigator
Fogarty International Center, NIH International Research Fellow Training
Assessment of liver metabolism on *in situ*, exposed rat livers using noninvasive ^{13}C, ^{31}P, ^{1}H MR spectroscopy using one of the first whole-animal MR spectrometer at 2.0 Tesla.

CLINICAL STUDIES ON INBORN ERRORS OF METABOLISM

NSR-AIMF570214 (Arias-Mendoza, F) 06/01/88-05/31/90 Principal Investigator
National System of Researchers, Mexico Federal Grant
Research grant award to study biological samples of children with Inborn Errors of Metabolism using different screening and diagnostic techniques, including MRS.

PREDICTING HUMAN TUMOR RESPONSE BY ^{31}P MR SPECTROSCOPY

U01CA0062556 (Brown, TR) 05/18/95-05/31/06 Co-PI from 1999
National Cancer Institute, NIH Cooperative U01
Assessment of the prediction of cancer sensitivity to treatment by tumor variables determined by ^{31}P MRS.

NMR STUDIES OF HUMAN CANCER

5P01CA41078 (Brown, TR) 07/01/97-03/31/05 PI Proj II; Co-Inv Proj I
National Cancer Institute, NIH Program Project P01
Use *in vivo, ex vivo,* and *in vitro* strategies with an emphasis on MRS to study cancer metabolism in humans.

DUAL-TUNED PROBE FOR MRI/MRS OF THE HUMAN BRAIN

1R43NS037273/1R44NS037273 (Srinivasan, R) 06/01/98-05/30/02 Consultant
National Institute of Neurological Disorders & Stroke, NIH R43 & R44
Build a dual-tuned (^{31}P and ^{1}H) probe for the study of the human brain using MRI and multinuclear MR spectroscopic imaging with similar field of views for both nuclei.

IN VIVO 31P & 1H MR SPECTROSCOPY STUDIES OF NON-HODGKIN'S LYMPHOMAS

5R01CA118559 (Brown, TR/Arias-Mendoza, F) 05/01/07-02/28/14 Co-PI & PI from 2010
National Cancer Institute, NIH R01 (cooperative)
Corroboration if the tumor PME/NTP value measured by ^{31}P MRS correlates with treatment outcome in an independent patient cohort and extend these findings by investigating absolute choline levels by ^{1}H MRS.

LEPTIN IN HUMAN ENERGY & NEUROENDOCRINE HOMEOSTASIS

5R01DK64773 (Liebel, R) 06/01/03-09/30/13 Co-Investigator
Natl. Inst. of Diabetes & Digestive & Kidney Diseases, NIH R01
Characterization of the effect of exogenous leptin and the maintenance of reduced body weight on systemic energetics and specific neuroendocrine and autonomic pathways related to energy metabolism.

PREDICTING OUTCOME OF EXPERIMENTAL THERAPY IN LYMPHOMAS BY 31P & 1H MR SPECTROSCOPY

5R21CA152858 (Arias-Mendoza, F) 07/01/10-05/31/13 Principal Investigator
National Cancer Institute, NIH R21
Assess if ^{31}P and ^{1}H MR spectroscopy could provide early and objective predictive measures of treatment response in recurrent/refractory patients with non-Hodgkin's lymphoma, treated with experimental therapy.

MITOCHONDRIAL ENCEPHALOMYOPATHIES & MENTAL RETARDATION

5P01HD032062 (DiMauro, S/De Vivo D) 12/01/04-02/28/15 Co-Investigator
Natl. Inst. of Child Disorders and Human Development, NIH P01
Large project program focused on mitochondrial encephalomyopathies and mental retardation.

NEW APPROACHES TO THE EVALUATION AND TREATMENT OF ACROMEGALY

R01DK064720 (Freda, PU) 07/01/09-06/30/14 Co-Investigator
Natl. Inst. of Diabetes, Digestive, & Kidney Diseases, NIH R01
Integrally study patients with acromegaly utilizing modern biochemical and imaging methods including whole-body MRI and ^{1}H MRSI of the liver and muscle in an ongoing prospective acromegaly patient cohort.

MOLECULAR PATHOGENESIS AND TREATMENT OF MNGIE
5R01HD056103 (Hirano, M) 04/01/10-01/31/15 Co-Investigator
Natl. Inst. of Child Disorders and Human Development, NIH P01
Characterization of a mouse model of mitochondrial neuro gastrointestinal encephalomyopathy (MNGIE).

MAGNETIC RESONANCE SPECTROSCOPY (MRS) TO ASSESS PROGRESSION OF ALZHEIMER DISEASE
PG004259 (Honing, S) 06/01/12-11/30/14 Co-Investigator
Alzheimer's Drug Discovery Fund Private
Brain study of patients with Alzheimer's disease to assess slope of temporal decline of N-acetyl aspartate, choline, myoinositol, and creatine measured by MRSI.

CHRONIC CONVECTION-ENHANCED DELIVERY (CED) OF TOPOTECAN FOR GLIOBLASTOMA
1R01CA161404 (Bruce, J) 07/01/12-04/30/17 Co-Investigator
National Cancer Institute, NIH R01
This study is a critical test of an innovative implantable catheter and pump system for delivering chemotherapy (topotecan) directly into the tumor for over extended time periods avoiding the side effects of standard drug delivery.

SARC SARCOMA SPORE, QUANTITATIVE IMAGING BIOMARKERS FOR ASSESSING RESPONSE TO THERAPY
1U54CA168512 (Pollock R/Schwartz JH) 07/01/12-06/30/17 Co-Investigator
National Cancer Institute, NIH P50/U54
Development of imaging biomarkers of apoptosis, angiogenesis, and hypoxia to predict therapeutic efficacy in sarcoma for early identification of therapeutic efficacy of molecular agents that target these processes.

PHASE II CLINICAL TRIAL OF PERIFOSINE PLUS TEMSIROLIMUS FOR RECURRENT GLIOBLASTOMA
JMDF (Lassman, A) 01/01/13-12/31/15 Co-Investigator
James S. McDonell Foundation Private
Demonstration of the efficacy of perifosine plus temsirolimus in patients with glioblastoma multiforme refractory to standard initial therapy (radiotherapy and temozolomide) in a phase II trial.

PENDING GRANT SUPPORT

MULTIPLATFORM MULTIVARIATE MODELS TO PREDICT TREATMENT OUTCOME IN DLBCL
1R21CA191778 (Arias-Mendoza, F) 01/01/16-12/31/20 Principal Investigator
National Cancer Institute, NIH R01
Grant application initially submitted as exploratory (1R21CA191778) to the National Cancer Institute during the first review cycle of 2014. Following the review of the initial application, the subsequent submission will be done as a full application (R01). The aim of this research program is the accurate determination of malignant foci and prediction of therapy outcome in DLBCL patients using MR technology. We aim to demonstrate if additional subcellular markers included into multiparametric multivariate models derives into a more precise prediction of treatment outcome in DLBCL patients.

INTERIM MR SPECTROSCOPIC IMAGING & POSITRON EMISSION TOMOGRAPHY TO NORM TREATMENT IN DLBCL
1R21CA185801 (Arias-Mendoza, F) 01/01/16-12/31/18 Principal Investigator
National Cancer Institute, NIH R21
Exploratory grant application submitted to NCI during the second review cycle of 2013. We based this application in our results where high levels of phosphomonoesters (PME) are present in foci of malignancy in DLBCL and other tumors. We determined (PME) by noninvasive MR spectroscopic imaging (MRSI). The present research seeks to demonstrate if the use of an interim (during treatment) MRSI exam could replace the interim biopsy needed to increase the positive predictive value of the *interim* positron emission tomography (i-PET) to risk-assign treatment in lymphoma patients.