RESUME SUMMARY

NAME: **Ali (Cyrus) Banan, Ph.D.**

PROFESSIONAL APPOINTMENTS:
University Distinguished Professor of Medicine & Physiology
Executive Vice President, Education, Research and Medical Affairs
Executive Dean, University Medical School and Affiliated Hospitals
Executive Director of Translational Medicine Research and Scholarship
Editor in Chief, Gastroenterology & Physiology, WebMed Central PLUS
Editorial Board, Integrative Molecular Medicine (IMM)
Editorial Board, Gastroenterology & Hepatology, MedCarve Publications
Chairman of Scientific Committee, EUSTM & Global NetWork on Translational Medicine
Senior Vice President, Research & Economic Development

MAILING ADDRESS: 600 Pawleys Drive**,** Simpsonville, SC 29681

TELEPHONE: (864) 675-5719

E-MAIL ADDRESS: cyrusbanan@charter.net

SUMMARY:

●Accomplished and seasoned executive with more than 20 years of highly successful research and education experience in the academia and industry, in particular academic higher education and scholarship.

●Accomplished researcher, teacher and administrator in higher education, Dr. Banan came to Windsor University after serving 4 years as Executive Director of Research and Education and Senior Vice President for Emerge at the University of South Carolina Greenville, with previous stints as Chief Science and Education Officer and Senior Vice President Research & Economic Development or Global Head of Research and Education at Emerge, Abbott and Rush University at Chicago.

●Served on over 50 professional committees and over 100 national and international organizations, volunteer boards, government/public health councils, industry, and academia.

♦Secured well over $350 million of research and education funding from various sources, including private industry, government (NIH, HHS, CDC, DARPA), and venture capital nationally and globally.

●Leadership responsibility for all aspects of academic and research affairs at the University, including: Colleges and Campuses; University Library; Graduate School; Undergraduate Studies; Institutional Research and Sponsored Programs; Academic budgets; Strategic Planning for Academic and Research Affairs; Board Reporting and Liaison; Board of Trustees reporting and staffing of Academic Affairs Committee; Innovation and Entrepreneurial Initiatives; Strategic Hiring Initiatives, in partnership with the Office of Research; Performance and Performance Metrics; Enrollment Management, Admissions & Records, Financial Aid; Accreditation; Institutes and Centers; Institutional Technology; Academic Legislative and Government Liaison; Quality Enhancement Reviews; Quality Enhancement Program; International Programs; Distance learning; and varied other responsibilities. Constitutionally, second in leadership responsibility for University after President.

●Leadership responsibility for all aspects of faculty work-life at the University, including: Promotion and Tenure; Faculty Evaluation; Faculty Senate; Faculty Assignments; Implementation of Collective Bargaining Agreement for Faculty; Faculty Development, including new faculty orientation; Faculty Awards and Recognition; Professional education; Orientation; Faculty dispute resolutions; Accrediting Agency reporting on faculty credentials, competence, governance, academic freedom; Member of the University Executive Cabinet; Oversight of new curricular program development and approval, and

related communication with Board of Trustees and accreditation agencies. Oversight of student academic grievance hearings; and other responsibilities.

●Led global research and education teams key in the discovery research, development, pre-clinical evaluation, and clinical development across multiple therapeutic and healthcare areas.

●Research and scholarship activities included creating strategic Road Maps / Long Range Plans (LRP) and strategic research and educational initiatives, technology/executive management, operations, finances, innovation, scientific/education affairs, licensing, business development, partnerships, communications, legal (IP/ intellectual property), and regulatory affairs.

●Created and managed also several highly successful Global R&D programs, including most recently a $7.8 Billion Business Unit, by setting new or innovative research directions, visions, and strategies.

●Progressed and achieved several innovative healthcare products for the R&D pipelines; worth an estimated $1.8 billion.

●Renowned scientist and academician on the International and National stages. Dr. Banan was a tenured, Professor and Director of Digestive Diseases Research and Education at RUSH University of Chicago as well as Professor and Exec. Director at University of South Carolina School of Medicine, Greenville while being the Chief Science Officer and Senior Vice President Research & Economic Development at Emerge. He is a recognized global expert in basic, clinical, and translational medicine research and scholarship areas, in particular immune/autoimmune and inflammatory disorders as well as a seasoned executive who has achieved tremendous success by leveraging innovation during his hybrid academic and industry career.

●Founding Head of the Departmental Research and Education at RUSH Chicago Medical School in Illinois, and Founding Head of the University Wide Research and Education at the USC Medical School Greenville South Carolina.

●Built the fastest growing digestive diseases inflammation research and education program in the United States while at RUSH Chicago Medical School (US News & World Report ranking of organization: 26th in the Nation in 2006 vs. unranked in 1999). Served at Rush in a number of administrative roles and was central in the development of a research development park allowing for successful partnerships between the university and industry; one of the first successful examples of this unique academic/industry partnership in the Nation to enhance both research and scholarship programs.

●Established a novel, integrated basic science discovery research, translational medicine research, and clinical science research and education programs on the national stage at USC Medical School Greenville. In particular, established an innovative holistic approach to research using translational medicine research, cell and molecular medicine, comparative research, and implementation sciences known as the health integration research. At USC Greenville, he was the third-highest ranking administrator, providing academic leadership for the university's campus, research centers and institutes, while overseeing related academic education and research support services, and responsibility for curriculum, academic and research planning.

●Led the large University Wide research and education related organization, infrastructure and support, including research discovery and translational medicine programs, institute for advancement of healthcare (IAHC), other national research programs (institute for translational oncology and immunology research, "iTOR", bioengineering research institute, "CUBEInc."), sponsored programs office, research development corporation (RDC, academia-industry partnerships), human subject protection office, and clinical trials office.

●Led the efforts for development of a novel integrated curriculum for one of the first new medical schools in the country in 40 years. USCSOM recently received full accreditation by the LCME. Dr. Banan accepted the position of executive administrator for Research and Academic and Curriculum Development for the Greenville Health System and was appointed Executive Director for University Wide Research and Education for the USC School of Medicine Greenville where he also led the educational program development and the Office of Educational Affairs. His efforts in teaching and curriculum development also led to Dr. Banan serving as Executive Director of the Educational programs, Chair of Curriculum Committee, and Head of Curriculum Development (undergraduate, graduate).

●Originated and authored a new University Wide Research and Education Vision or Road Map (5 to 10 year long range plans) and attendant key Strategic Initiatives for successful, rapid expansion of University Wide Research and Education programs. In particular, substantially expanded the innovation, caliber, and national prominence of our new University Wide Research and Education programs, including successfully securing large institutional and new funding sources of approximately $150 Million over 3 years (NIH, HHS, CDC, DARPA, Duke Foundation, and private industry among others) for rapid expansion of Research and Scholarship programs.

●At Windsor University, he is the second-highest ranking officer of the university, providing academic leadership for the university's colleges, campuses, research institutes, while overseeing academic support services and student services, and responsibility for curriculum, academic planning, faculty appointments, faculty development and promotion, and tenure decisions among many other responsibilities.

●At Abbott and Baxter, he also led global Discovery Research and Development Units for not only personalized healthcare/diagnostics research, but also for pharmaceuticals in multiple therapeutic areas, such as inflammation and immunology and oncology (among others) where oversaw the development of small molecule and biologic portfolio as well as attendant personalized healthcare strategies and technologies from idea to research through to clinical Proof of Concept and then launch.
●Overall, he is a highly seasoned researcher and academic educator with proven track-record of successfully leading innovative Academic Research and Education programs, nationally and globally.
●Author of 300+ peer-reviewed research publications, book chapters and abstract presentations as well as invited national and international presentations; and inventor of several worldwide patents.

PROFESSIONAL EXPERIENCE:

***Executive Vice President,* Education, Research and Medical Affairs, 2014-Present**
Executive Dean* of Medicine*;
***University Distinguished Professor* of Medicine and Physiology**
***Executive Director* of Translational Medicine Research and Scholarship**
University of Windsor School of Medicine (WUSM) and Affiliated Hospital Systems
SKB, West Indies and Chicago, IL, USA

●As EVP, I lead education, research and medical, undergraduate, and graduate affairs at one of the largest US style University Medical Schools in the Caribbean basin with administrative and clinical offices in Monee (Chicago area) IL. It ranks among the top 5 US style international Universities in this area.

● As the second-highest ranking officer of the university, I provide academic leadership for the university's colleges, campuses, research institutes, while overseeing academic support services and student services, and responsibility for curriculum, academic planning, faculty appointments, faculty development and promotion, and tenure decisions among many other responsibilities.

● As Executive Dean of University Medical School and Affiliated Hospitals, I am further responsible for overall strategy of our large Medical and Clinical affairs programs involving large numbers of clinical and basic sciences faculty as well as responsibility for ensuring the advancement of quality and clinical excellence for medical affairs and clinical operations. I thus lead the administrative, clinical, medical, and academic programs of our large university. This has also involved greatly enhancing the medical affairs, clinical operations, basic biomedical sciences, hiring many new top caliber faculty from US and Europe, substantially improving various departments, including medical education department, creating new national and global clinical collaborations as well as adding new infrastructure. We have at least 1400 medical students across the 4 years of our high quality medical education programs. I have also greatly enhanced and integrated the basic and clinical curriculum (both horizontal and vertical integration), substantially improved assessment and evaluation departments, using the latest educational pedagogies (student centered learning), and infrastructure additions as well as adding a new state of the art stimulation center and large medical Library facilities.

●I lead the efforts for development of a novel integrated curriculum. Dr. Banan also leads the University wide educational program development and of Educational Affairs. His efforts in curriculum development also led to Dr. Banan enhancing graduate programs as well as undergraduate and/or dual degree programs as well as forging new educational partnerships.
●I also lead the efforts to reorganize and create an innovative, new model of an academic institution for Windsor. WUSM is comprised of schools (graduate, undergraduate, dual degree) and centers/institutes, and includes academic, teaching and learning centers, patient care partnerships, and research facilities. The integration of these entities, educational, research, graduate, undergraduate, health-related missions, is designed to create a single large, innovative organization that will lead to a novel educational model for education, research, clinical care and community service, educate the next generation of health care providers utilizing health care team approaches, and conduct meaningful research.

● As Executive Director North American Biomedical (NBRI) Research Institutes in Translational Research, I lead one of the largest research and development institutions of its kind with large national and global collaborations using a novel hybrid model of academic and industry partnerships, including three international centers of research and scholarship excellence (COE) in basic and translational research funded by large industry (e.g., Biotech), Private, Government, and Venture Capital. I have recently secured large venture capital and private funding of approximately $1.10 billion dollars to expand this global research and education collaboration over the next 4 years (~$250 million per annum). I have tapped into private equity and private investors for further expansion of our global educational programs as well as importantly educational, research and scholarship enterprises (e.g., IP-related clinical items where creative large equity investment has been made possible).

Executive Director of Research and Scholarship, **2012-2014**
Professor of Medicine, Physiology, and Biomedical Sciences
Senior Vice President Research & Education, Emerge **2011-Present**
University of South Carolina School of Medicine- Greenville
Greenville Hospital System University Medical Center

●Directed launch and ongoing LCME accreditation of research and educational programs of a new medical school here at USCSOMG. In addition to my previous roles as Founding Head of the Departmental Research & Education at RUSH Chicago Medical School in Illinois, and Founding University Wide Research & Education Activities of the USCSOMG South Carolina, I have been central in establishing the novel integrated basic science research, translational research, and clinical science research and education programs. I have also been central in establishing an innovative approach to research and education at USCSOMG using translational medicine research, cell & molecular medicine, cell & molecular pharmacology, physiology, immunology, and inflammation, comparative research, and implementation sciences known as the health integration research and education.
●I led the research and education related organization, infrastructure and support, including research discovery and translational medicine programs, institute for advancement of healthcare, other national research programs ("CUBEInc", "iTOR"), sponsored programs office, research development corporation (RDC), human subject protection offices, and clinical trials offices. These have also excelled under my leadership.
●I led the efforts for development of a novel integrated curriculum for one of the first new university medical schools in the country in 40 years. USCSOM recently received full accreditation by the LCME. Dr. Banan accepted the position of executive administrator for Research and Academic and Curriculum Development for the Greenville Health System and was appointed Executive Director for Research and Education for the USC School of Medicine Greenville where he also led the educational program development and the Office of Educational Affairs. His efforts in teaching and curriculum development also led to Dr. Banan serving as Executive Director of the Educational programs, Chair of Curriculum Committee, and Head of Curriculum Development (undergraduate, graduate).

Chief Science Officer, Senior Vice President Research & Economic Development, 2011-Present

Emerge (a Successful University Research and Educational partnership I Co-founded at USC)
Chicago, IL; Greenville, SC

●As one of the highest ranking officers of Emerge (a novel industry and university research partnership), our strategy has been to develop next generation therapies and precision medicine tools for autoimmune and inflammatory disorders in order to impact public health and economic activity in local communities we serve. We are targeting several disorders such as including Inflammatory Bowel Diseases (Ulcerative Colitis and Crohn's Disease), psoriasis, lupus, multiple sclerosis, rheumatoid arthritis among others, including cancers.
●Co-founded and built Emerge Pharmaceuticals and Precision Medicine, an educational, research, biotech and molecular diagnostics company in partnership with academia, raised $150M in venture capital, and concluded a $700M license with DARU based upon a nitration inhibitor as well as molecular genomic precision biomarker tool that was invented. Emerge is currently valued at $1.2 Billion.
●As Chief Science and Education Officer, SVP of Research at Emerge, Dr. Banan built a research and scholarship program of four novel enzyme therapies and their molecular precision Medicine tools for rare autoimmune, inflammatory, and orphan diseases as well as cancers in close collaboration with several university partners.

***Global Senior* Director, R&D** **2008-2012**
***Global* Head of Discovery Research and Translational Medicine,**
Personalized Healthcare Research, Drug Therapeutics & Biomarkers
Abbott Diagnostics and Pharmaceuticals Division
Abbott Laboratories
Abbott Park, IL

Global Director, R&D
Global Clinical, Medical & Exploratory Research Affairs, Medication Delivery
IV Therapeutics, Drugs, and Nutrition
Baxter International Healthcare Corporation
Medication Delivery, IV Therapy
Deerfield, IL

●Created and led the Global Discovery Research and Translational Medicine, Drug Therapeutics, and Personalized Healthcare / Diagnostics in several crucial areas of unmet clinical needs (i.e., Disease States Discovery and Translational Medicine Research and Development) for a $7.8 Billion business unit.

●Directed successfully global R&D efforts to develop new therapeutics and novel biomarkers for several immune/autoimmune and inflammatory disorders through effective collaboration with internal networks (global cross-divisional teams) and external networks (academia; NIH Centers of Excellence; Key Opinion Leaders / KOL; Clinical and Translational Sciences Consortia in US, Asia, Japan, and Europe).

●Led global innovation research efforts in other key disease areas including cancer, cardiovascular, gastrointestinal/ digestive disorders, neuroscience, and inflammation.

●Led R&D efforts which created and managed successful global, cross-divisional research teams that resulted in at least 12 novel diagnostics and therapeutics products for the R & D pipelines worth an estimated $1.0 billion.

●Originated & created a new Vision or Road Map and a 15 year LRP (Long Range Plan) and Strategic Research Initiatives for Global Personalized HealthCare and Therapeutics businesses to further substantially expand the innovation pipeline of novel products for both diagnostics and therapeutics R & D. Projected worth of this future innovation pipeline for R&D is estimated to be near $2.5 to 3.0 billion during the first decade.

●Created and led the global IV Therapy, Nutrition/ Pharmekonutrition, and Therapeutic Drugs R&D divisions of Baxter from a virtual start-up stage of exploration and discovery research to its current growing position as a leader in the research discovery and development of novel therapeutics.

●Sparked the development of new drugs, novel pharmekonutritions, and innovative lipid based protective (anti-inflammatory) technologies at Baxter.

●Pioneered 7 innovative products for global R &D pipelines at Baxter worth an estimated $0.80 billion.

Professor of Med, Physiology & Pharmacology **1997-2009**
Director of Research, Division of Digestive Diseases
Rush University Medical Center
Department of Medicine
Section of Gastroenterology and Nutrition
Chicago, IL

Professor of Medicine
Director of IBD (Digestive Diseases) Research
Loyola University of Chicago Medical Center
Department of Medicine, Division of Gastroenterology
May Wood, IL

●Became (at age of 33) the *Founding Research Director* of the Division of Digestive Diseases at Rush University Medical Center (Chicago, IL). Provided innovative leadership in all research and clinical trials and educational endeavors and was highly responsible for the development of a basic, clinical, and translational GI research distinguished division.
●Built the fastest growing GI or digestive diseases inflammation research program in the United States (US News & World Report ranking of organization: 26th in the Nation in 2006 vs. unranked in 1999).

●Created a renowned GI or digestive diseases research center focused on Inflammatory Bowel Diseases and Liver Diseases among other digestive disorders.

●Tenured Professor and the Director of Digestive Disease Research at University, Division of Digestive Diseases & Gastroenterology.

●Renowned scientist on both national and international stages. Scientific authority on inflammatory disorders, in particular Inflammatory Bowel Diseases and liver diseases (including inflammation-initiated cancers), and free radical injury and its prevention. Trained in physiology, immunology, gastrointestinal patho-physiology and mucosal biology (University of Tennessee and St Louis University).

●Sought and successfully received multiple large grant awards from the United States, National Institute of Health (NIH), totaling over several million dollars during the previous decade.

●Authored more than 300 scientific publications across therapeutic areas (including peer reviewed published original articles, book chapters, peer-reviewed published abstracts, and other relevant scientific articles).

●Established a world class GI or digestive diseases Inflammation Research Program at Rush University, Division of Digestive Diseases & Gastroenterology. Attained success in promoting, directing, and administering many research activities and clinical trials at the University Level.
●Succeeded in promoting basic research activities to many external funding agencies (e.g., NIH, pharmaceuticals, diagnostics, nutrition, etc), and representing the research interests at many national and international meetings.
●Combined funding of the 3 most recent translational medicine grants as Principal Investigator or as Co-PI approximated $12 million U.S. dollars in Total, Direct Costs (for 5 years; included large Program Project and RO1 type of grants + R-21 exploratory type of grants)
●Guided and mentored many students, residents, fellows, post-docs, as well as junior faculty with their research. Engaged in conducting high quality externally funded research and clinical development as well

as building research teams, developing younger investigators, and managing many people and large budgets.

Chief Scientific and Education Officer, 1999-2008

Radikal Therapeutics (a University Research and Educational Partnership I founded at RUSH)

Chicago, IL; Boston, MA

●As CSO of Radikal Therapeutics, a multi-national biotechnology and research firm, I focused on the discovery research and clinical development of transformative pharmaceuticals, including for immune/inflammatory disorders and Cancer. Developed a deep pipeline of therapeutics created in-house at our technology park (a partnership with Rush University I led and founded), and a paradigm-disruptive research discovery engine, as well as global clinical reach, I positioned RT partnership to remain at the forefront of research discovery and clinical development.

●Created novel research platforms to include small and large molecules that therapeutically suppress inflammation, restore free radical equilibrium, redirect aberrant signaling pathways in inflammation/immune diseases, manipulate mitochondrial cell death pathways, modulate DNA repair, restore microcirculatory perfusion, and induce specific immunotolerance among other innovative modalities.

●Created novel varied structural targets, directed at diverse clinical and public health needs, the technologies shared a unified concept of correcting pathophysiology by endowing agents with multi-functional capacity. This approach yields biological synergies that far outstrip the potency of traditional single-target agents.

EDUCATION / SPECIAL TRAINING:

Post-Doctoral Fellow
in Surgery & Digestive Physiology/Pathophysiology
Dept. of Surgery and Surgical Research Institute
St. Louis University Medical Center.
St. Louis, MO.
With Dr.Thomas. A. Miller, C. Rollins Hanlon Professor & Chairman, Dept. of Surgery

Ph.D., Physiology (GI) and Immunology
(Top Honors)
University of Tennessee Medical Center, Memphis
Title: Relationship between Polyamines,
Cytoskeleton, and Gastric Mucosal Ulcer Healing in Rats
With Dr. Leonard R. Johnson, Gerwin Professor & Chairman Dept. of Physiology and Biophysics

B.S. Biology, minor in Philosophy
(Summa Cum Laude, Top Honors)
Mount Saint Mary's College
Emmittsburg, Maryland

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FULL CURRICULUM VITAE

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Simpsonville, SC 29681

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E-MAIL ADDRESS:cyrusbanan@charter.net

PROFESSIONAL AND ACADEMIC APPOINTMENTS:

EVP, Education, Research & Medical Affairs, 2014-Present
Executive Dean of Medicine
University Distinguished Professor of Biomedical Sciences & Physiology
Exec. Director of Translational Research & Scholarship
University of Windsor School of Medicine (WUSM) and Affiliated Hospital Systems
St. Kitts, West Indies
Administrative Offices: Chicago, Illinois, 60449

Executive Director of Research & Scholarship, 2012-2014
Professor of Medicine, Physiology and Biomedical Sciences
Senior Vice President Research/Education, Emerge 2011-Pres.
University of South Carolina School of Medicine- Greenville
Greenville Hospital System University Medical Center
701 Grove Road
Greenville, SC 29605

CSO, Senior Vice President Research & Economic Dev., 2011-Pre
Emerge (a University Research Park & Educational partnership)
Chicago (Crystal Lake), IL 60014
Greenville, SC, 29607

Global Senior Director, R&D 2008-2012
Global Head of Discovery Research and Translational Medicine,
Personalized Healthcare Research, Therapeutics & Biomarkers
Global Diagnostics and Pharmaceuticals,
Abbott Diagnostics and Pharmaceuticals Division
Abbott Laboratories
Abbott Park, IL 60064

Global Director, R&D
Global Clinical & Exploratory Research Affairs,
Medication Delivery
IV Therapeutics, Drugs, and Nutrition
Baxter International Healthcare Corporation
Medication Delivery, IV Therapy
DF5-3E, One Baxter Parkway
Deerfield, IL 60015

Professor of Med., Physiology & Pharmacology 1997-2009
Director of Research, Division of Digestive Diseases
Rush University Medical Center
Department of Medicine
Section of Gastroenterology and Nutrition
1725 W. Harrison, Suite 206
Chicago, IL 60612

Associate Professor of Med., Physiol. & Pharmacol.
Director of Research, Division of Digestive Diseases
Rush University Medical Center
Department of Medicine,
Section of Gastroenterology and Nutrition

Assistant Professor of Med. & Pharmacology
Director of Inflammatory Bowel Disease (IBD) Research,
Section of Gastroenterology and Nutrition
Rush University Medical Center
Department of Medicine

Assistant Professor of Medicine
Loyola University of Chicago Medical Center
Department of Medicine, Division of Gastroenterology
2160 South First Avenue
May Wood, IL 60153

Chief Scientific and Education Officer, 1999-2008
Radikal Therapeutics (University Research & Educational partnership)
Boston, MA 02575
Chicago, IL, 60612

Post-Doctoral Fellow 1996-1997
St. Louis Univ. Medical Center
Dept. of Surgery and Surgical Research Institute
St. Louis University Medical Center.
St. Louis, MO.
With Dr.Thomas. A. Miller,
C. Rollins Hanlon Professor

& Chairman, Dept. of Surgery

Graduate Student 1991-1995
Department of Physiology & Biophysics
University of Tennessee, Memphis
Memphis, TN.
With Dr. Leonard R. Johnson
Gerwin Professor & Chairman
Dept. of Physiology and Biophysics

EDUCATION:

Post-Doctoral Fellow 1996-1997
in Surgery & Physiology/Pathophysiology
St. Louis Univ. Medical Center
Dept. of Surgery

Ph.D., Physiology and Immunology 1995
(Top Honors)
University of Tennessee Medical Center, Memphis
Title: Relationship between Polyamines,
Cytoskeleton, and Gastric Mucosal Ulcer Healing in Rats

B.S. Biology, minor in Philosophy 1988
(Summa Cum Laude, Top Honors)
Mount Saint Mary's College
Emmittsburg, Maryland

PROFESSIONAL SOCIETY MEMBERSHIPS:

- ♦ American Gastroenterology Association (AGA), 1996 (active).
- ♦ American Physiological Society (APS), 1996 (active).
- ♦ Gastroenterology Research Group (GRG), 1997 (active).
- ♦ Mid-West Physiological Society, 1999 (active).
- ♦ American Society for Pharmacology and Experimental Therapeutics (ASPET), 1999 (active)

ACADEMIC HONORS AND AWARDS:

UNDERGRADUATE

- ♦ National Biology Honor Society
- ♦ George Henry Miles Honor Society (requires GPA of at least 3.7 or higher)
- ♦ President of Biology & Science Club, 1986-1987
- ♦ Recipient of Wickenhieser's Presidential Award for an Exceptional/Outstanding College Student (highest GPA among peers)

GRADUATE

- ♦ President of Graduate (Physiology) Student Association, 1992-1994
- ♦ Graduate Honor Society 1992-1995

CURRENT

♦Dr. Banan serves on over 50 professional committees and over 100 national and international organizations, volunteer boards, government/public health councils, industry, and academia.

♦He has secured well over $350 million of research funding from various sources, including private industry, NIH, and venture capital nationally and globally.

♦*Chair of Scientific Committee* for European Society for Translational Medicine (EUSTM) and Global Net Work on Translational Medicine 2013-present.

♦*Advisory Board* for European Society for Translational Medicine (EUSTM) 2013-present.

♦*Editor in Chief*, Gastroenterology and Physiology, WebMed Central PLUS, 2013-present.

♦*Editorial Board*, WebMed Central PLUS, Scientific Publications, 2013-present.

♦*Editorial Board*, Gastroenterology and Hepatology, MedCarve Publications, 2013-present.

♦*Editorial Board*, Integrative Molecular Medicine (IMM), OAT Publications, 2014-present.

♦*Senior Vice President Research*, Emerge 2011-present

♦Repeated Recipient of Experimental Biology (EB) and/or Digestive Disease Week (DDW or American Gastroenterological Association / *AGA*) Presentations of Distinction (top 5% to 10% from among thousands of submissions) and ORAL FORUMS (Invited Speaker, Top 5%):

♦Invited speaker, FASEB (EB): 1474, April 1995

♦Invited speaker, FASEB (EB): 1277, April 1997

♦Invited Speaker, Surgical Forum, May 1997

♦Invited speaker, Gastroenterology (AGA), Vol:112, (#4) A64, May 1997.

♦Invited speaker, Gastroenterology (AGA) Vol:116, G2364, May 1999.

♦Invited speaker, Central Society for Clinical Res. (CSCR): 218A, 1999.

♦Invited speaker, Gastroenterology (AGA) 118 (4, pt 1):2365, May 2000.

♦Invited speaker, Gastroenterology (AGA) 120 (5, pt.1):3748, May 2001.

♦Presentation of Distinction, Gastroenterology (AGA) 120:2563, 2001.

♦Invited speaker, Gastroenterology (AGA), 122 (4, pt. 1):771, May 2002.

♦Presentation of Distinction, Gastroenterology (AGA) 122: M1132, 2002.

♦Invited speaker, Gastroenterology (AGA), 124 (4, pt.1):858, May 2003.

♦Presentation of Distinction, Gastroenterology (AGA), 124:M1126, 2003.

♦Presentation of Distinction, Gastroenterology (AGA) 124: T1044, 2003.

♦Presentation of Distinction, Gastroenterology (AGA) New Orleans, LA May, 2004

♦Invited speaker, Gastroenterology (AGA), Chicago, IL, May 2005.

♦Invited speaker, Gastroenterology (AGA), Los Angeles, CA, May 2006.

♦Invited speaker, Gastroenterology (AGA), Washington, DC, May 2007.

♦Invited Speaker. Baxter Health Care International Symposium, September, 2009 (Belgium).

♦Invited Speaker. Baxter Health Care Global Symposium, October, 2009 (China).

♦Invited Speaker. Abbott Global Network of Excellence on Translational Medicine, September, 2010 (Germany).

♦Invited Speaker. Abbott Global Network of Excellence on Translational Medicine, September, 2011 (France).

♦Invited Key Note Speaker. European Society for Translational Medicine and Global Network on Translational Medicine, October 2013 (Luxembourg).

♦Invited Key Speaker. European Society for Translational Medicine and Global Network on Translational Medicine, October 2014 (Austria).

- ♦ Among 1000 most cited scientists in the world, 2000 – 2008
- ♦ NIH Research Career Development Award
- ♦ NIH MERIT Award, 2002-2008

Steering Member of:

♦American Gastroenterology Association (AGA)

♦American Physiological Society (APS)

♦American Society for Pharmacology and Experimental Therapeutics (ASPET)

♦Gastroenterology Research Group (GRG)

SELECTED CLINICAL TRIALS AND CLINICAL DEVELOPMENT (from a list of 52 clinical trials and clinical developments for both small molecules and biologics and others):

Humira & Crohn's Disease: A study to determine the clinical efficacy and safety of inductions and maintenance therapy with Humira in patients with active Crohn's disease. A phase III, multi-center, placebo-controlled study to evaluate the clinical efficacy and safety of inductions and maintenance therapy with Humira in subjects with active Crohn's disease (CD) who have had an inadequate clinical response and/or intolerance to medical therapy.

Humira & Ulcerative Colitis: A study to evaluate the clinical efficacy and safety of inductions and maintenance therapy with Humira in patients with active ulcerative colitis.

Humira & Pediatric Crohn's Disease: A study to evaluate the clinical efficacy and safety of inductions and maintenance therapy with Humira in pediatric patients with active CD.

AST-120 and Crohn's Disease: A study to assess the safety and efficacy of AST-120 in mild to moderately active Crohn's patients with fistulas. This is a double-blind, randomized, placebo-controlled multi-center study to assess the safety and efficacy of AST-120 in mild to moderately active Crohn's patients with fistulas.

Abatacept & Crohn's Disease: A study to determine the clinical efficacy and safety of inductions and maintenance therapy with Abatacept in patients with active Crohn's disease. A phase III, multi-center, placebo-controlled study to evaluate the clinical efficacy and safety of inductions and maintenance therapy with abatacept in subjects with active Crohn's disease (CD) who have had an inadequate clinical response and/or intolerance to medical therapy.

Abatacept & Ulcerative Colitis: A study to evaluate the clinical efficacy and safety of inductions and maintenance therapy with abatacept in patients with active ulcerative colitis.

OPC 6535 and Crohn's Disease: A study to assess the safety and efficacy of OPC 6535 in mild to moderately active Crohn's patients with fistulas.

OPC 6535 and Ulcerative Colitis: A study to evaluate the clinical efficacy and safety of inductions and maintenance therapy with OPC 6535 in patients with active ulcerative colitis.

INO 1001 and Ulcerative Colitis: A study to evaluate the clinical efficacy and safety of inductions and maintenance therapy with INO-1001 in patients with active ulcerative colitis.

Dysbiosis and IBD: A Longitudinal Study of dysbiosis in Inflammatory Bowel Disease.

Alcohol and Inflammation in Crohn's and Ulcerative Colitis: A study that examines the effect of alcohol on the inflammation in Crohn's and ulcerative colitis patients.

Bacterial Overgrowth in Older Individuals: A study of small bowel bacterial overgrowth in older individuals.

Dietary Treatment of Crohn's Disease: To study dietary treatment of Crohn's disease.

Dysbiosis in Inflammatory Bowel Disease: A Cross-Sectional Study on dysbiosis in Inflammatory Bowel Disease.

Economic Impact of Celiac Disease: A study to determine the economic costs of having celiac disease.

Effect of bowel preps on bacterial flora: A study measuring the effect of bowel preps on the bacterial flora of the colon.

Inflammatory Bowel Disease and Melatonin: Inflammatory bowel disease and melatonin use.

Inflammatory Bowel Repository: Inflammatory Bowel Repository use.

Mind/Body Medicine and Inflammatory Bowel Disease (IBD) Flare-Up: A study to determine whether practice of one of two mind/body courses, among patients with moderately severe ulcerative colitis in remission, prevents flare-up of the disease.

Oral Hygiene and Its Affect on Patients with Inflammatory Bowel Disease: A study examining oral hygiene and its affect on patients with inflammatory bowel disease.

The Use of Complementary and Alternative Medicines in Patients with Inflammatory Bowel Disease (IBD): A study on use of complementary and alternative medicines in patients with inflammatory bowel disease.

Use of Ginger to Reduce Nausea Associated with Bowel Prep: A study to determine if ginger reduces the symptoms of nausea and vomiting associated with bowel preparation prior to colonoscopy.

PROJECTS AND CLINICAL RESEARCH INTERESTS:

1. Role of growth factors (e.g., EGF; TGF-α) in gastrointestinal mucosal protection and repair: *Novel therapeutic approaches for inflammatory bowel disease/ IBD* (Principal Investigator on a 5 yr *NIH R01,* NIDDK originally funded study).

2. The effects of herbal antioxidants on gut mucosal barrier function and inflammatory events: Potential uses in IBD Therapy? (Principal Investigator on a 3 yr *NIH R-21,* NCCAM originally funded study).

3. Oxidative effects of alcohol on gastrointestinal mucosa (Co- Principal Investigator on a 5 yr *NIH R01,* NIAAA originally funded study).

4. Modulation of GI Microtubule Cytoskeleton: Novel Molecular Signals (Principal Investigator on a newly submitted 5 yr *NIH R01,* NIGMS study).

5. EGF and Intestinal Barrier Integrity & Inflammation: Molecular Mechanisms in vivo & in vitro (Principal Investigator on a newly submitted 5 yr *NIH R01,* NIDDK study).

6. Beneficial affects of a new herbal IBD mixture - *IBD Mix B* - for gut health: Anti-Inflammatory Actions (Principal Investigator on a newly submitted 3 yr *NIH R-21,* NCCAM study).

7. Novel Mechanism for Alcohol Promotion of Breast and Colon Cancer (Co- Investigator on a newly submitted 5 yr *NIH R01,* NIH Cross agency study).

8. Role of TACE (ADAM17) in Intestinal Permeability and Inflammation (Co- Investigator on a newly submitted 5 yr *NIH R01,* NIDDK study).

9. Ozone Air Quality and Promotion of Gut Inflammation: A Novel Approach to How Inflammation in IBD Develops (Principal Investigator, to be submitted 5 yr *NIH R01,* NIEHS study).

10. Heregulin-β and ErbB 3/4 Growth Factor Receptor Signaling & Inflammation-Induced Cancer in GI Mucosa (Principal Investigator, to be submitted 5 yr *NIH R01,* NIDDK study).

11. Molecular mechanisms of mucosal tissue injury induced by Alcohol: PKC-lambda Dependent events (Principal Investigator, to be submitted 5 yr *NIH R01, NIAAA* study).

12. Alcohol and "EMT" Promotion of Colon Cancer (Co- Investigator, to be submitted 5 yr *NIH R01,* NIAAA study).

13. Role of reactive oxygen and nitrogen metabolites in inflammatory bowel disease.

14. The effects of NF-kB and inducible-nitric oxide synthase (iNOS) pathways on gastrointestinal barrier integrity.

15. Role of Protein Kinase C isoform (e.g., β1, ζ, δ, λ, θ) signaling in modulation of the integrity of the gastrointestinal barrier function.

16. Role of ErbB growth factor signaling in GI inflammation (and cancer) and development of inflammatory bowel disease.

17. Novel transcription factor Nurr-1 in GI barrier integrity and mucosal inflammation.

18. The effects of oxidative stress (e.g., alcohol and oxidants) on the gut cytoskeletal and tight-junctional permeability.

19. Shared pathogenesis of inflammatory bowel disease (IBD) and alcoholic liver disease (ALD) in Gut Mucosa: Role of Oxidative stress and barrier hyperpermeability induced by Novel PKC isoform mediated signaling events.

20. Calcium signaling and Gut barrier dysfunction.

21. Role of Phospholipase C (e.g., γ1) signal transduction in gut barrier stability by growth factors.

22. Role of cytoskeletal (α-tubulin, β-actin) mutations in the development of gastrointestinal inflammation (e.g., inflammatory bowel disease).

23. Intestinal micro-flora in Health and Disease: How IBD Develops.

ACADEMIC AND NON-ACADEMIC COMMITTEE MEMBERSHIPS (SELECTED FROM A LIST OF OVER 50):

University Wide Research Standing Committee- Rush University	1999 – 2009
University Wide Education Committee- Rush University	1999 – 2009
Senior Leadership Executive Advisory Committee- Rush University	2002- 2009
Occupational Safety Committee - Rush University	2001 – 2009
Research & Academic Laboratory Safety Standing Committee - Rush University	2000 – 2009
Research and Education Committee – Rush Digestive Diseases	1999 – 2009
Image Motility & Laser Confocal Standing Committee – Loyola University	1997- 1999
Research and Education Vision Readiness University Advisory Committee	1999- 2013
Faculty Promotion University Standing Committee	1999- 2009
Faculty Senate (Member, then Chair)	2000- 2009
Long Range Plans and Strategic Initiatives Committee	2005- present
Reorganization and Change Committee	2007- present
Senior Leadership Committees (e.g., “RDC”, “LRP”)	2002- present
University Wide Education & Curriculum Executive Committee (3 Univ.)	2005- present
University Wide Research & Scholarship Executive Committee (3 Univ.)	2002 - present
Academic Year (Curriculum Development) Committee- USCSOMG	2012 – 2014
Research Advisory Committee - Biomedical & Clinical Sciences- USCSOMG	2012 – 2014
GI & Hepatic M2 Curriculum Development Subcommittee Chair- USCSOMG	2012 – 2014
GI Physiology M1 Curriculum Development Subcommittee- USCSOMG	2012 – 2014
University Wide Education & Curriculum Executive Steering Committee- WUSM	2014- present
University Wide Research Executive Steering Committee- WUSM	2014 -present

EDITORIAL SERVICES AND GRANT REVIEWS/ STUDY SECTIONS:

Editor in Chief, Gastroenterology and Physiology, WebMed Central PLUS.
Editorial Board, Gastroenterology and Hepatology, MedCarve Publications.
Editorial Board, Integrative Molecular Medicine (IMM), OAT Publications.
Editorial Board, Journal of Gastric Disorders and Therapy, SciForschen Publications
Editorial Board, SOJ Clinical Trials, Symbiosis Open Access Journals (SOJ)
Editorial Board, Science Cronicon International

Reviewer for the following Journals
- ♦Journal of Clinical Investigation
- ♦Gastroenterology
- ♦American Journal of Physiology (Cell Physiology)
- ♦American Journal of Physiology (GI & Liver Physiology)
- ♦Journal of Applied Physiology
- ♦Journal of Pharmacology & Experimental Therapeutics
- ♦Free Radical Biology & Medicine
- ♦Hepatology
- ♦European Journal of Cell Biology
- ♦Gut (British Journal of Gastroenterology)
- ♦Digestive Diseases and Sciences

Reviewer for the following Institutes
- ♦NIH Study Section, *NCCAM* (National Institute for Complementary and Alternative Medicine)
- ♦NIH Study Section, *NIDDK* (National Institute for Digestive, Diabetes and Kidney Diseases)
- ♦Veterans Administration (*VA*) Merit Grant Award Reviews
- ♦Crohns' and Colitis Foundation of America (*CCFA*)
- ♦National Science Foundation (*NSF*)
- ♦Broad Medical Foundation (for IBD Research)

PATENTS (SELECTED FROM A LIST OF 15 WHITE PATENTS):

♦***Patent for Measurement of Marker of Oxidative Stress in Plasma of Patients with Inflammatory Bowel Disease (IBD)*;** United States Patent and Trade Mark Office (USPTO). Patent Application Inventors Banan A.

{One of the most challenging and difficult aspects of research in oxygen free radicals (oxidants) is lack of reliable and easy tests to measure the level of oxidative stress in patients with oxidative and inflammatory conditions. Our laboratory has developed a simple, sensitive, and reliable blood test that can measure the level of oxidative stress in man (e.g., plasma). This test can be extremely helpful, not only to scientists who are studying the mechanism of the disease, but also to the clinical investigators who are trying to establish the efficiency of therapeutic agents. This novel assay can be adopted for an easy quick test in the form of an ELISA kit, which can be used by a wide range of consumers even the general public**}**.

♦***Patent for Measurement of Protein Oxidation and Nitration in Patient Tissues*;** United States Patent and Trade Mark Office (USPTO). Patent Application Inventors Banan A.

♦***Patent for Assessment of Atypical PKC isoforms (PKC-Lambda, PKC-Iota) activity in cell-based assays*;** United States Patent and Trade Mark Office (USPTO). Patent Application (to be filed); Inventors Banan A.

♦***Patent for Measurement of cytoskeletal oxidation and depolymerization in human tissues*;** United States Patent and Trade Mark Office (USPTO). Patent Application Inventors Banan A.

♦***Patent for Assessment of Novel PKC isoform activity (PKC-theta, PKC-nana, PKC-mu) in tissue and cell-based assays*;** United States Patent and Trade Mark Office (USPTO). Patent Application (to be filed); Inventors Banan A.

TEACHING AND TRAINING RSPONSIBILITIES:

TEACHING

GI Physiology and GI Laboratory Section for First Year Medical Students	1997- present
GI Physiology and Gastroenterology Fellows Didactic Course	1999-2009
Journal Club for Gastroenterology & Digestive Diseases	2000-2009
Graduate Physiology, Core Graduate Course (GCC 504)	1997-2009
Tissue Function in Health & Disease Core Graduate Course (GCC 514)	2005-2009

ADVISOR TO GRADUATE STUDENTS & RESIDENTS RESEARCH COMMITTES (selected from a list of over 87 medical students, graduate students, residents, and fellows)

Research Advisory Committee for Dr. Sri Kommanduri, September 1999-2003
Doctoral Advisory Committee for Dr. Marcello Del Carlo, Jr. September 2000-2005
Masters Advisory Committee for Dr. Anizi E. Aneziokoro, August 2001-2004
Masters Advisory Committee for Dr. Sushma Gunanpaldi, August 2001-2004
Research Advisory Committee for Dr. Ashkan Farhadi, August 2002-2005
Research Advisory Committee for Dr. Mitch Kaplan, January 2002-2004
Research Advisory Committee for Dr. Sanjay Gupta, August 2003- 2004
Research Advisory Committee for Dr. Garth Swanson, January 2004-2007
Doctoral Advisory Committee for Mr. Lu Quam, August 2002-2007

RECENT RESEARCH TRAINESS

Mentor for research training of Graduate Students (three in the last 5 years)
Mentor for research training of Medical Residents (four in the last 5 years)
Mentor for research training of GI Fellows and Research Fellows (7 in the last 5 years)
Mentor and Advisor for research training of Medical Students (106 M1+M2 in the last 2 years)

RESEARCH SUPPORT AND FUNDING:

A. <u>Principal Investigator (PI) and Co-PI</u>

1. "**Systems Biology Approach to Identifying Biomarkers for IBD**" **(PI)** *R01 from National Institutes of Health *(NIH, NIDDK* / National Institute of Digestive, Diabetes and Kidney Diseases)
* ~ top 4% percentile $ 1, 988,920 September 2011 – August 2016

2. "Systemic & Gut Inflammation and Intestinal Barrier Integrity" (Co-PI)
*PO1 from National Institutes of Health *(NIH, NIDDK* / National Institute of Digestive, Diabetes and Kidney Diseases)
* ~top 6% percentile $ 4, 499,000 June 2014 – May 2019

3. "Mucosal Healing and Resolution Using Novel Anti-inflammatory Herbal mixtures" (PI)
R01 from National Institutes of Health *(NIH, NCCAM* / National Institute of Complementary and Alternative Medicine), Pending
$ 1, 362,500 June 2015 – May 2020

4. "Intestinal barrier disruption and its prevention as a therapeutic target in GI Disease: Novel Molecular Target" (PI)
Research grant from WUSM (Internal Research Funds)
$ 400,000 July 2015 – December 2018

5. "Growth Factor EGF, Inflammation & Intestinal Mucosal Barrier Integrity: Translational Molecular Mechanisms to Clinics" (Co-PI, *submitted grant*), Pending
P01 submitted for consideration for funding to National Institutes of Health *(NIH, NIDDK)*

$ 4,688,724 September 2015 – August 2020

6. "Molecular Mechanism of an Herbal Antioxidant Mixture B for IBD" (PI, *submitted grant*), Pending
R21 submitted for consideration for funding to National Institutes of Health *(NIH, NCCAM)*
$ 398,750 October 2015– September 2017

7. "Regulation of Intestinal Microtubule Cytoskeleton Function: Novel Molecular Signaling Events" (PI, *submitted grant*), Pending
R01 submitted for consideration for funding to National Institutes of Health (*NIH, NIGMS/ National Institute for General Medical Sciences*)
$1,345,000 December 2015 – November 2020

8. "Ozone Air Quality and Promotion of Gut Inflammation: A Novel Approach to How IBD Develops" (PI, *submitted grant*)
R01 submitted to National Institutes of Health (*NIH,* NIEHS */ National Institute for Environmental Health Sciences)*
$2,111,000 October 2015 – September 2020

9. "Heregulin-β and ErbB 3/4 Growth Factor Receptor signaling & Inflammation-Induced Cancer in GI Mucosa" (Co-PI, to be *submitted grant*)
R01 to be submitted to National Institutes of Health (*NIH,* NCI*)*
$1,250,000 January 2016 – December 2020

10. "Alcohol-induced GI Injury: PKC-Lambda dependent Mechanisms for Mucosal Instability" (PI, to be *submitted grant*)
R01 submitted to National Institutes of Health *(NIH, NIAAA*/ National Institute for Alcoholism and Alcohol Abuse)
$1,130,000 January 2016– December 2020

11. "New Pathways for Protecting Cells against Oxidative Stress Insult" (Co-PI, to be *submitted grant*)
Research grant to be resubmitted for consideration for Funding to the National Science Foundation (*NSF*) $ 650,453 2015 –2017

12. "Center of Excellence for Intestinal Health" (PI) (Pending submission)
P30 Center of Excellence Grant to National Institutes of Health (*NIH, NCCAM*)
$5, 000,000 January 2016 – December 2021

B. CO- Principal Investigator (Co-PI) and Co- Investigator (Co-I): Other Grants

13. "**Brain-gut circadian rhythm interactions in gut leakiness in IBD" (Co-PI)** *R01 from National Institutes of Health *(NIH, NIDDK* / National Institute of Digestive, Diabetes and Kidney Diseases)
$ 1, 563,193 September 2011 – August 2016

14. "Alcohol: gut barrier dysfunction & clock gene proteins in liver injury" (Co-PI)
*R01 from National Institutes of Health (*NIH, NIAAA*),
* 10 % percentile $ 2, 334,000 July 2014 – June 2019

15. "Novel Mechanisms for Alcohol Promotion of Breast and Colon Cancer" and "Alcohol and EMT Promotion of Colon Cancer" (Co-I, two *submitted grants*), Pending
Two different R01's submitted for consideration for funding to National Institutes of Health (*NIH,* NIH Cross Agency and NIAAA*)*
$ 1, 925,000 October 2015 – September 2020

16. **"Role of TACE (ADAM17) in Intestinal Permeability and Inflammation" (Co-I, *submitted grant*),** Pending
R01 submitted for consideration for funding to National Institutes of Health (*NIH,* NIDDK*)*
$ 1, 800,000 January 2016 – December 2020

17. "Center of Excellence for Intestinal Health" (Co-I on "Project ALD" and "Lab Core) (Pending submission)
P30 Center of Excellence Grant to National Institutes of Health (*NIH, NCCAM*)
$5, 000,000 January 2016 – December 2021

C. *Principal Investigator and Co-Investigator (selected from a list of over 80 academic and/or industry grants)*

Past Support

18. "EGF, Oxidants, and Gut Barrier"
PI: A. Banan, Ph.D.
Agency: NIH (NIDDK)

Type: NIH R01 Research Grant. $1, 299,000 6/1/2002 – 5/31/2008
* ~top 7% percentile

19. "Protective Mechanism of an Anti-inflammatory Herbal mixture"
PI: A. Banan, Ph.D.
Agency: NIH (NCCAM)
Type: NIH R21 Research Grant. $ 362,500 6/1/2005 – 5/31/ 2008
* ~ top 5% percentile

20. "Oxidant-induced intestinal barrier disruption and its prevention by epidermal growth factor and transforming growth factor-alpha in a human intestinal cell line: Molecular Mechanisms"
PI: A. Banan, Ph.D.
Agency: Rush University (Internal Medicine Research Fund) $ 250,000 7/1/2005 – 12/30/2008

21. "EGF, Inflammation & Intestinal Barrier Integrity"
PI: A. Banan, Ph.D.
Agency: NIH (NIDDK)
Type: NIH R01 Research Grant. $1,195,747 6/1/1998 – 5/31/2002
* ~top 6% percentile

22. "Alcohol: gut barrier dysfunction & liver injury"
Co-PI: A. Banan, Ph.D.
Agency: NIH (NIAAA)
Type: NIH R01 Research Grant. $1,677,000 6/1/1997 – 5/31/2002
* ~top 10% percentile

23. "Surgical Studies on Prostaglandins in GI Tract"
Co-I: A. Banan, Ph.D.
Agency: NIH (NIDDK)
Type: NIH R01 Research Grant. $1,158,456 1/1/1997 – 12/31/2002

24. "Molecular Mechanism of Alcohol-induced increases in permeability of monolayers of intestinal epithelium"
PI: A. Banan, Ph.D.
New Investigator Research Award, Loyola University Research Fund
$100,000 03/1/98 – 04/1/99

25. "The effect of oat bran on intestinal integrity, inflammation, and permeability"
Co-PI: A. Banan, Ph.D.
Agency: Quaker Oats Corporation
Type: Study Research Grant. $495,000 1/1/1998 – 1/1/2001

26. "The effect of OPC compounds on intestinal integrity and inflammation".
Co-PI: A. Banan, Ph.D.
Agency: Otsuka America Pharmaceutical CO.
Type: Study Grant. $380,000 10/1/97 – 10/1/2000

27. "The effect of anti-oxidant AEOL-11201 on experimental colitis"
Co-PI: A. Banan, Ph.D.
Agency: AEOLUS Pharmaceutical
Type: Study Grant. $240,000 3/1/98 – 1/1/2000.

BIBLIOGRAPHY:

PEER-REVIEWED RESEARCH PAPERS PUBLISHED AND IN PRESS

1. **A. Banan**, J-Y. Wang, S. A. McCormack, and L.R. Johnson. Relationship between polyamines, actin distribution, and gastric mucosal ulcer healing in rats. *American Journal of Physiology* Vol. 34/No. 5 *(GI & Liver)*: G893-G903, 1996.

2. **A. Banan**, S. A. McCormack, and L.R. Johnson. Polyamines are required for microtubule formation during gastric mucosal ulcer healing. *American Journal of Physiology* Vol. 274/No. 37 *(GI & Liver)*: G879-G885, 1998.

3. **A. Banan**, G. S. Smith, E. R. Kokoska, and T.A. Miller. Protection against ethanol injury by prostaglandins in a human intestinal cell line: role of microtubules. *American Journal of Physiology* 274/No. 37 *(GI & Liver)*: G111-G121, 1998.

4. **A. Banan**, G. S. Smith, E. R. Kokoska, and T.A. Miller. Prostaglandins protect human intestinal cells against ethanol injury by stabilizing microtubules: Role of protein kinase C and enhanced calcium efflux. *Digestive Diseases & Sciences*, 44 (No. 4): 697-707, 1999.

5. E. R. Kokoska, G. S. Smith, **A. Banan**, and T.A. Miller. Adaptive cytoprotection against deoxycholate-induced injury in human gastric cells in vitro: is there a role for endogenous prostaglandins? *Digestive Diseases & Sciences*, 43 (No. 4): 806-815, 1998.

6. E. R. Kokoska, G. S. Smith, **A. Banan**, and T.A. Miller. Disturbed calcium homeostasis and injury in human gastric cells exposed to Ethanol: role of endogenous prostaglandins. *Surgical Forum*, Vol. XLVIII, p. 166-168, 1998.

7. E.R. Kokoska, G.S. Smith, **A. Banan**, and T.A. Miller. The role of calcium in adaptive cytoprotection and cell injury induced by deoxycholate in a human gastric cell line. *American Journal of Physiology*, 275 (2 pt 1): G322-30, 1998.

8. **A. Banan**, S. Choudhary, Y. Zhang, J.Z. Fields, and A. Keshavarzian. Ethanol-Induced Barrier dysfunction and its Prevention by Growth Factors in Human intestinal monolayers: evidence for oxidative and cytoskeletal mechanisms. *Journal of Pharmacology & Experimental Therapeutics*, 291(3): 1075-1085, 1999.

9. **A. Banan**, S. Choudhary, Y. Zhang, and A. Keshavarzian. Ethanol induces microtubule oxidation, nitration, and disassembly and disrupts barrier function in a human intestinal cell line. *Alcoholism Clinical & Experimental Research*, 23 (5): 669, 1999.

10. S. Choudhary, S. Yong, **A. Banan**, and A. Keshavarzian. Effect of oats on alcohol induced liver disease. *Alcoholism Clinical & Experimental Research*, 23 (5): 660, 1999.

11. **A. Banan**, G. S. Smith, E. R. Kokoska, and T.A. Miller. Role of actin cytoskeleton in prostaglandin-induced protection against ethanol in an intestinal epithelial cell line, IEC-6. *Journal of Surgical Research*, 88: 104-113, 2000.

12. **A. Banan**, S. Choudhary, Y. Zhang, and A. Keshavarzian. Role of the microtubule cytoskeleton in protection by epidermal growth factor and transforming growth factor-α against oxidant-induced barrier disruption in a human colonic cell line. *Free Radical Biology and Medicine*, 28(5), 727-738, 2000.

13. **A. Banan**, Y. Zhang, J. Losurdo, and A. Keshavarzian. Carbonylation and disassembly of the F-actin cytoskeleton in oxidant-induced barrier dysfunction and its prevention by epidermal growth factor and transforming growth factor-α in a human intestinal cell line. *Gut (British Journal of Gastroenterology)*, 46: 830-837, 2000.

14. **A. Banan**, J.Z. Fields, Y. Zhang, Heather Decker, and A. Keshavarzian. Nitric Oxide and Its Metabolites Mediate Ethanol-Induced Microtubule Disruption and Intestinal Barrier Dysfunction. *Journal of Pharmacology and Experimental Therapeutics*, 294 (3), 997-1008, 2000.

15. T.A. Miller, G.S. Smith, **A. Banan**, and E.R. Kokoska. Cytoskeleton as a Target for Injury in Damaged Intestinal Epithelium. *Microscopy Research & Technique*, 51(2): 149-55, 2000.

16. **A. Banan**, L. Fitzpatrick, Y. Zhang, and A. Keshavarzian. OPC-Compounds Prevent Oxidant-Induced Carbonylation and Depolymerization of The F-Actin Cytoskeleton and Intestinal Barrier Hyperpermeability. *Free Radical Biology and Medicine*, 30(3), 287-298, 2001.

17. **A. Banan**, Y. Zhang, J.Z. Fields, and A. Keshavarzian. Key role of PKC and Calcium Homeostasis in Epidermal growth Factor-Induced Protection of the Microtubule Cytoskeleton and Intestinal Barrier against Oxidant Injury. *American Journal of Physiology (GI & Liver)*, 280: G828-G843, 2001.

18. **A. Banan**, J.Z. Fields, Y. Zhang, and A. Keshavarzian. iNOS Upregulation Mediates Oxidant-Induced Disruption the F-Actin Cytoskeleton and Permeability Barrier of Monolayers of Intestinal Epithelia. *American Journal of Physiology (GI & Liver)*, 280: G1234-G1246, 2001.

19. S. Choudhary, A. Keshavarzian, M. Wade, and **A. Banan**. Novel Antioxidants Zolimid and AEOL 11201 Ameliorate Colitis in Rats. Digestive Diseases and Sciences. *Digestive Diseases & Sciences*, Vol. 46 (10): 2222-30, 2001.

20. **A. Banan**, J.Z. Fields, D.A Talmage, Y. Zhang, and A. Keshavarzian. The β1 Isoform of Protein Kinase C Mediates Epidermal Growth Factor-Induced Protection of the Microtubule Cytoskeleton and Intestinal Monolayer Barrier Function against Oxidant Injury. *American Journal of Physiology (GI and Liver)*, 281: G833-G847, 2001.

21. **A. Banan**, Y. Zhang, J.Z. Fields and A. Keshavarzian. Targeted Molecular inhibition of PLC-γ Prevents EGF-Mediated Protection of Microtubule Cytoskeleton & Intestinal Barrier Function. *American Journal of Physiology (GI and Liver),* 281: G412-G423, 2001.

22. A. Keshavarzian, S. Choudhary, **A. Banan,** and J.Z. Fields. Preventing gut leakiness by oats supplementation ameliorates alcohol-induced liver damage in rats. *Journal of Pharmacology & Experimental Therapeutics*, 299 (2), 442-448, 2001.

23. T.A. Miller, E.R. Kokoska**,** G.S. Smith, and **A. Banan**. Role of calcium homeostasis in gastric mucosal injury and protection. *Life Sci*, 69(25-26): 3091-102, 2001.

24. A Farhadi, J.Z. Fields, **A. Banan**, and A. Keshavarzian. Reactive Oxygen Species: Are they involved in the pathogenesis of GERD, Barrett's Esophagus, and latters progression towards esophageal cancer? *American J. Gastroenterology*, Vol 97(1): 22-26, 2002.

25. A. Farhadi, A. Keshavarzian, L.F. Fitzpatrick, and **A. Banan**. The Modulatory Effects of Plasma and Colonic Milieu of Patients with Ulcerative Colitis on Human PMN Oxidative burst: Therapeutic Efficacy of OPC Anti-Oxidants. *Digestive Diseases & Sciences*, 47(6): 1342-1348, 2002.

26. **A. Banan**, J. Z. Fields, D.A Talmage, L. Zhang, and A. Keshavarzian**.** A Protective role for Protein Kinase C: The Atypical PKC-Zeta (ζ) Is Required for the Protection of the Microtubule Cytoskeleton and Barrier Integrity of Human Intestinal Monolayers Against Oxidants. *American Journal of Physiology (GI & liver),* 282: G794-G808, 2002.

27. **A. Banan**, L. Zhang, J. Z. Fields, D.A. Talmage, and A. Keshavarzian. PKC-ζ Prevents Oxidant-induced iNOS Upregulation and Protects microtubules and Intestinal barrier integrity. *American Journal of Physiology (GI & liver),* 283: G909-G922, 2002.

28. **A. Banan**, L. Zhang, J.Z. Fields, A. Farhadi, and A. Keshavarzian. Protein Kinase C-β1 Mediates the Protective effects of Epidermal Growth Factor on the Dynamic Assembly of the F-actin Cytoskeleton and Normalization of Calcium Homeostasis in A Human Colonic Cell Line. *Journal of Pharmacology & Experimental Therapeutics*, 310:852-866 2002.

29. **A. Banan**, L. Zhang, A. Farhadi, J.Z. Fields, and A. Keshavarzian. Activation of the Delta (δ) Isoform of PKC (PKC-δ) Is Required for Oxidant-Induced Disruption of both the Microtubule Cytoskeleton and Permeability Barrier of Intestinal Epithelia. *Journal of Pharmacology & Experimental Therapeutics*, 303:17-28, 2002.

30. A. Keshavarzian, **A. Banan**, S. Kommandori, A. Farhadi, Y. Zhang, and J.Z. Fields. Increases in Colonic Free Radicals and in Cytoskeletal Protein Oxidation and Nitration in The Colonic Mucosa of Patients with Inflammatory Bowel Disease. *British Journal of Gastroenterology (Gut),* 52(5): 720-728, 2003.

31. A. Farhadi, **A. Banan,** J.Z. Fields, and A. Keshavarzian. Intestinal Barrier: An interface Between Health and Disease. *Journal of Gastroenterology & Hepatology*, 18(5):479-497, 2003.

32. **A. Banan**, L. Zhang, J.Z. Fields, and A. Keshavarzian. The Novel Delta (δ) Isoform of PKC Causes iNOS & NO Upregulation: A Key Mechanism for Oxidant-induced Carbonylation, Nitration, and Disassembly of the Microtubule Cytoskeleton and Hyperpermeability of Barrier of Intestinal Epithelia. *Journal of Pharmacology & Experimental Therapeutics*, 305(2):482-94, 2003.

33. A. Farhadi, A. Keshavarzian, E.W. Holmes, J.Z. Fields, Zhang, **A. Banan**. Gas Chromatographic Method for Detection of Urinary Sucralose: Application to the Assessment of Intestinal Permeability. *J Chromatography B Analyt Technol Biochem*, 784(1):145-54, 2003.

34. A. Farhadi, **A. Banan** A. Keshavarzian. Role of Cytoskeletal Structures in Modulation of Intestinal Permeability. *Arch Iranian Med* J. (AIMJ), 6(1):49-53, 2003.

35. **A. Banan**, L. Zhang, J.Z. Fields, A. Farhadi, and A. Keshavarzian. Evidence That NF-κB Activation Is Critical in Oxidant-Induced Disruption of The Microtubule Cytoskeleton & Barrier Integrity and That Its Inactivation Is Essential in EGF-Mediated Protection of The Monolayers of Intestinal Epithelia. *Journal of Pharmacology & Experimental Therapeutics*, 306(1): 13-28, 2003.

36. **A. Banan**, L. Zhang, J.Z. Fields, A. Farhadi, and A. Keshavarzian. Key role of Role of Phospholipase C-gamma (PLC-γ) Isoform in EGF Protection of Epithelial Barrier against iNOS upregulation and F-actin Nitration and Disassembly. *American Journal of Physiology (Cell Physiology)*, 285(4): C977-C993, 2003.

37. **A. Banan**, L. Zhang, J.Z. Fields, A. Farhadi, and A. Keshavarzian. Zeta (ζ) Isoform of Protein Kinase C Prevents Oxidant-Induced NF-κB Activation and I-κBα Degradation: A Fundamental Mechanism for EGF Protection of The Microtubule Cytoskeleton and Intestinal Barrier Integrity. *Journal of Pharmacology & Experimental Therapeutics*, 307(1): 53-66, 2003.

38. **A. Banan**, L. Zhang, J.Z. Fields, A. Farhadi, and A. Keshavarzian. Requirement for The Classical PKC isoform beta 1 (PKC-β1) signaling in the Suppression of the NF-κB / I-kBα Proinflammatory Pathway and in Protection of Cell Monolayer Barrier by EGF Under Conditions of Oxidative Stress. *American Journal of Physiology (Cell Physiology)*, 286(3):C723-38, 2004.

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109. ***A. Banan**, M. Shaikh, L. Zhang, J. Z. Fields, E. Mutlu, A. Farhadi, C. B. Forsyth, A. Keshavarzian. Alterations Of PLC-γ1–PKC Isoform Pathway And The I-kappa B Kinase (I-kK)—NFkB Pathway Predict The Extent Of Mucosal Barrier Protein Isotype Instability in Man: A Novel Barrier Dependent Mechanism For Oxidation And IBD Pathophysiology. Presented at 107th Annual Meeting of the American Gastroenterological Association (Digestive Disease Week) May, 2007 Washington, DC.

110. ***A. Banan**, P. Engen, L. Zhang, M. Shaikh, C. B. Forsyth, Y. Tang, A. Keshavarzian. Novel Therapies Against Inflammation Using Botanical Dietary Supplements – Scuttelaria Baicalensis Is a Potent Suppressor of NF-kB Pathway: Anti-inflammatory Potential via Prevention of I-kB Degradation in Intestinal Epithelium. Presented at 107th Annual Meeting of the American Gastroenterological Association (Digestive Disease Week) May, 2007 Washington, DC.

111. ***A. Banan**, L. Zhang, M. Shaikh, Y. Tang, C. B. Forsyth, A. Keshavarzian. Inactivation Of The Atypical PKC-Lambda (PKC-λ) Isoform Enhances Cellular Migration And Cytoskeletal Remodeling in Enterocyte Monolayers: A Novel Wound Healing Mechanism in Epithelium. Presented at 107th Annual Meeting of the American Gastroenterological Association (Digestive Disease Week) May, 2007 Washington, DC.

112. **A. Banan**, R. Turpin, K. Williams, M. Reynolds. Bloodstream Infection Rates, Length of Stay, and Costs Associated with Compounded versus Multi-chamber Bag Parenteral Nutrition in Gastrointestinal Surgical Patients. Presented at Annual Meeting of American College of Gastroenterology (P264) October, 2009; San Diego, CA.

113. **A Banan**, T. Pavlina, G. Zaloga, K. Harvey, R. Saddiqui. Oleic acid prevents stearic acid-induced inhibition of cell growth and pro-inflammatory responses in human aortic endothelial cells. Presented at Annual Meeting of Experimental Biology (A106 / 4551), Los Angeles, CA, 2010.

OTHER INVITED PRESENTATIONS (SELECTED FROM A LIST OF OVER 150 NATIONAL and INTERNATIONAL PRESENTATIONS):

- Relationship between polyamines, actin cytoskeleton, and gastric mucosal ulcer healing. University of Tennessee Health Sciences Center, October 1994.

- Role of polyamines in gastric mucosal ulcer healing. St. Louis University Medical Center, Dept. of Surgery (Guest of Dr. T.A. Miller), December 1994.

- Relationship between polyamines, actin cytoskeleton, and gastric mucosal ulcer healing. Harvard University, Brigham & Womens' Hospital, Divison of Gastroenterology (Guest of Dr. W. Silen), November 1994.

- Prostaglandins protect human intestinal cells against ethanol injury by stabilizing microtubules: Role of protein kinase C and enhanced calcium efflux. Loyola University Medical Center, Department of Medicine / Digestive Diseases, December1997.

- Prostaglandins cytoprotection: signal transduction mechanisms. Loyola University Medical Center, Dept. of Cell Biology, May 1998.

- Protection against oxidative barrier dysfunction by growth factors in a human colonic cell line: role of G- & F-actin cytoskeleton. Central Society for Clinical Research Chicago, October 1999.

- Growth Factors Protect against Intestinal Epithelial Hyperpermeability by Stabilizing Microtubules: Role of Protein Kinase C Signal Activation and Calcium homeostasis. Rush University Medical Center, Dept. of Pharmacology, March 2000.

- Growth Factors Protect against Intestinal Epithelial Hyperpermeability by Stabilizing Microtubules: Role of Protein Kinase C Signal Activation and Calcium homeostasis. American Gastroenterology Association, Forum Invited Talk at International Conference of Digestive Disease Week (DDW) May, 2000.

- Delta (δ) Isoform of PKC (PKC-δ) Explains How Oxidants Disrupt the Microtubule Cytoskeleton and Injure Monolayers of Intestinal Epithelia. American Gastroenterology Association, Forum Invited Talk at International Conference of Digestive Disease Week (DDW) May, 2002.

- Evidence that NF-κB Activation is Critical to Oxidant Disruption of Cytoskeleton & Barrier integrity and that it's Inactivation is key to EGF Protection of Monolayers of Intestinal Epithelia. American Gastroenterology Association, Forum Invited Talk at International Conference of Digestive Disease Week (DDW) May, 2003.

- EGF, Microtubule Cytoskeleton, and Gut Barrier Integrity. Rush University Medical Center, Dept. of Biochemistry, 2004.

- Zeta (ζ) Isoform of PKC Is A Unique Modulator of the I-κB Kinase βeta (I-κK-β) Pathway and Is Crucial to Monolayer Protection by EGF: A Novel Anti-inflammatory

Mechanism in Intestinal Epithelium. American Gastroenterology Association¸ Forum Invited Talk at International Conference of Digestive Disease Week (DDW) May, 2005.

- Protein Kinase C-Delta (PKC-δ) Isoform Is a Key Regulator of NF-kB and Its Endogenous Modulator I-kB During Oxidative Stress Injury: A Crucial Pro-Inflammatory Mechanism in Gut Epithelium. American Gastroenterology Association¸ Forum Invited Talk at International Conference of Digestive Disease Week (DDW) May, 2006.
- Activation Of PKC-β1 Isoform – A Novel Mechanism For The Beneficial Effects Of Lactobacillus GG (LGG) On Monolayers Of Intestinal Epithelial Cells. American Gastroenterology Association¸ Forum Invited Talk at International Conference of Digestive Disease Week (DDW) May, 2006.
- Critical Role of NO Overproduction and Oxidative Stress (Nitration, Carbonylation) In Increased Gut Barrier Leakiness In An Animal Model of Alcoholic-Liver Disease (ALD). American Gastroenterology Association¸ Forum Invited Talk at International Conference of Digestive Disease Week (DDW) May, 2007.
- EGF and PKC isoforms are modulators of the inflammatory pathways and crucial to gut barrier integrity: Novel anti-inflammatory mechanisms in gut epithelium. University of Iowa, Dept. of Medicine/Digestive Diseases (Guest of Dr. B. Luxon), June 2008.
- Innovative Translational Medicine Strategies for Discovering and Developing Modern Therapeutics. Baxter Health Care International Symposium, September, 2009 (Belgium).
- Translational Medicine Strategies for Nutritional Therapeutics. Baxter Health Care Global Symposium, October, 2009 (China).
- Key role of Translational Medicine and Personalized HealthCare in Clinical Development Strategies for New Therapeutics: Cutting Edge Approaches. Abbott Global Network of Excellence on Translational Medicine, September, 2010 (Germany).
- Global Strategies in Translational Medicine and Personalized HealthCare. Abbott Global Network of Excellence on Translational Medicine, September, 2011 (France).
- Translational Medicine and Personalized HealthCare: Bridging the Gap from Basic Sciences to the Clinics on a Global Scale. *Key Note Speech*. European Society for Translational Medicine and Global Network on Translational Medicine, October 14th 2013 (Mondorf Luxembourg).
- Global Efforts in Translational Medicine. Invited Key Speaker. European Society for Translational Medicine and Global Network on Translational Medicine, October 2014 (Vienna Austria).