

# The PMI Times

Department of Pathology, Microbiology & Immunology  
USC School of Medicine  
The Communication Source for PMI Faculty, Staff & Students  
Department Chair: Dr. Mitzi Nagarkatti  
Editors: Dr. Angela Murphy & Nicki Holt



SEPTEMBER ~ DECEMBER 2015  
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## News & Updates:

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Dr. Jennifer Nyland served as chair of the scientific committee for the Carolina Women's Health Research Forum. The forum was held at the Russell House on October 23, 2015.

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Dr. Tonya Colpitts served as a scientist reviewer on the Department of Defense Peer-Reviewed Medical Research Program grant review panel in December.

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Dr. Chatzistamou contributed to the development of the *Head and Neck Pathology Module* of **HIPONE-Modules on Histopathology: A valuable online tool for students, researchers and professionals**, supported by the Lifelong Learning Program of the Educational, Audiovisual and Culture Executive Agency (EACEA) of the Commission of the European Union.

Dr. Ray gave a presentation on 'Novel Combination Therapy for Neuroprotection in SCI' in the SCIRF Board Meeting Lunch-n-Learn Seminars, USC SOM Dean's Board Room, Columbia, SC 29208, November 13, 2015.

Dr. Udai Singh served on the National Institutes of Health (NIH) "Cellular and Molecular Immunology A" study section on October 1-2, 2015.

Dr. Narendra Singh has been invited to chair an Epigenetics Session at the upcoming 55<sup>th</sup> SOT Meeting being held in New Orleans from March 13 to March 17, 2016.

Dr. Venkatesh Hegde gave a talk titled "MicroRNA Regulatory Circuits And Myeloid Cells In Immune Dysregulation by Cannabinoids" which was coauthored by Dr. Prakash Nagarkatti and Dr. Mitzi Nagarkatti, at the 2015 *Carolina Cannabinoid Collaborative* meeting (Immune Regulation and Cancer Session) held at the National Institute on Alcohol Abuse and Alcoholism (NIAAA), NIH (Nov 13-15, Rockville, MD).

Dr. Angela Murphy served as a reviewer of Nutrition and Obesity Research Center (NORC) P30 grants for the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) in November.

Dr. Udai Singh served on the National Institutes of Health (NIH) Innate immunity and Host defense (IHD) Study Section on October 22-23, 2015.

Dr. Ray gave a presentation 'Modulation of Cell Death Mechanisms in Neurodegenerative and Neoplastic Diseases' at the Integrated Biomedical Sciences Symposium on August 19, 2015.

Dr. Udai Singh served on the Congressionally Directed Medical Research Program (CDMRP), Department of Defense study section on December 8<sup>th</sup>, 2015 panel reviewing grants on Interstitial Cystitis.

Dr. Carole Oskeritzian served as a member of the Scientific Committee for the International Mast Cells and Basophils Conference held in Marseille, France, October 21-23, 2015. During the symposium on Mast cell/Basophil Signaling, she gave an invited talk entitled "Sphingosine-1-phosphate and mast cell networking in early-phase inflammation".

Dr. Angela Murphy served as a reviewer for NIH National Center for Complementary and Integrative Health (NCCIH) SBIR/STTR grants in October 2015.

Dr. Udai Singh serves on the Editorial Board of the following journals "World Medical Student Journal," "European Journal of Medical Sciences" as well as "Exploratory Research and Hypothesis in Pharmacology".

Dr. Narendra Singh will be leading a Discussion on *In Vitro* Lecture at the upcoming 55<sup>th</sup> SOT Meeting being held in New Orleans from March 13 to March 17, 2016.

Dr. Ray participated as a Member of the Neuroblastoma (NB) review panel in the 2015 Congressionally Directed Medical Research Programs (CDMRP) - Peer Review Cancer Research Program (PRMRP) on November 15, 2015.

Dr. Jennifer Nyland served as a reviewer for the American Heart Association – Immunology Basic Science in September 2015.

Lorraine Madur, an undergraduate student from the University of Bordeaux, France did a 3-month internship with Dr. Mitzi Nagarkatti and Dr. Prakash Nagarkatti.

Welcome to Dr. Lorene Leiter, Program Manager in the lab of Dr. Prakash Nagarkatti and Dr. Mitzi Nagarkatti.

Our Medical Student Interest Group (MSIG) for Pathology, this academic year with Class of 2018 student leaders Ross Tanis and Jacob Nelson, and with Dr. James Catroppo as faculty advisor, received a \$750 MSIG grant from the Intersociety Council for Pathology Information (ICPI) to promote and encourage outstanding medical students to consider a career in pathology. To that end, and in conjunction and celebration of International Pathology Day, for its first event on 16 November the group invited two practicing pathologists, Drs. Jeff Welsh and Dr. Olga Raetskaya-Solntseva of Pathology Associates of Lexington to give a talk on the "Past, Present, and Future in the Practice of Pathology – A Few Cases to Surprise your Surgeon". Dr. Welsh is an alumnus of MUSC, a Past President of the Columbia Medical Society, President-elect of the South Carolina Society of Pathologists, and a delegate to the College of American Pathologists. Dr. Solntseva is a summa cum laude graduate of USC, not to mention a magna cum laude graduate of our medical school and historically the "founding father mother" of our school's Medical Student Interest Group (MSIG) for Pathology. The event, at which lunch was offered, was well received with over 60 M1 and M2 students and pathology faculty in attendance. Students also received promotional literature on the theme of pathology as a career, and were given the opportunity to interact with our speakers in the setting of a question and answer period, as well as individually after the talk, where they also had the opportunity to meet and speak with our pathology faculty.



(L to R) Dr. Jeff Welsh, M2 Students Ross Tanis and Jacob Nelson, Dr. Olga Raetskaya-Solntseva.

## Honors & Awards:

The paper published by Drs. Narendra Singh, Udai Singh, Michael Rouse, Jiajia Zhang, Saurabh Chatterjee, Prakash Nagarkatti and Mitzi Nagarkatti on "Dietary indoles suppress delayed-type hypersensitivity by inducing a switch from proinflammatory Th17 cells to anti-inflammatory regulatory T cells through regulation of microRNA" in the Journal of Immunology was highlighted "In this Issue" as "Inspiring T Cell Indole-ence in DTH."

The publication in the Journal of Neuroimmune Pharmacology titled "Evidence for Epigenetic Regulation of Pro-Inflammatory Cytokines, Interleukin-12 and Interferon Gamma, in Peripheral Blood Mononuclear Cells from PTSD Patients" authored by Drs. Marpe Bam, Xiaoming Yang, Juhua Zhou, Jack Ginsberg, Quinne Leyden, Prakash Nagarkatti and Mitzi Nagarkatti was highlighted by GenomeWeb, Nov 23, 2015 under the Breaking News Category.

The article published by Jessica Sido, Prakash Nagarkatti, and Mitzi Nagarkatti titled " $\Delta$ 9-Tetrahydrocannabinol attenuates allogeneic host-versus-graft response and delays skin graft rejection through activation of cannabinoid receptor 1 and induction of myeloid-derived suppressor cells" in the Journal of Leukocyte Biology Sept. issue 2015 was covered in AAAS EurekAlert FASEB, Sept. 2015 "Can Marijuana help transplant patients?"

Dr. Ratanesh Seth won the Presidential Choice Distinction Award at the 2015 Annual Meeting of the American Association for the Study of Liver Diseases (AASLD) held in San Francisco for the presentation coauthored by Suvathi Das, Diptadip Dattaroy, Firas Alhasson, Phillip D. Bell, Gregory A. Michelotti, Mitzi Nagarkatti, Prakash Nagarkatti, Wolfgang B. Liedtke, Anna Mae Diehl and Saurabh Chatterjee on "TRPV4 regulates inflammation and Kupffer cell activation in nonalcoholic steatohepatitis by attenuation of CYP2E1-mediated oxidative stress."

Mary Harrell, an undergraduate researcher in Dr. Greg Gomez's lab, received a Magellan Scholar Grant to study the Toll-Like Receptor 4 pathway in human skin mast cells.

Ambrish Kumar, Postdoctoral Fellow in the laboratory of Dr. Ugra Singh, was awarded the *Carolina Woman's Health Research Forum Award- 2015* for best poster in Basic Science. The meeting was organized by University of South Carolina Department of Obstetrics and Gynecology and held on October 23, 2015. His oral and poster presentation was entitled: "Metformin Impairs Rho GTPase Signaling and Inhibits the Survival and Migration of Neuroblastoma Cells." Ambrish Kumar, Nadia Al-Sammarraie, Donald J. DiPette, Ugra Singh.

Katherine M. Castleberry (Oskeritzian Laboratory), an undergraduate student in Biology, was awarded a Magellan grant from the USC Office of Research in December of 2015 to pursue her research on mast cells and angiogenesis in skin inflammatory disorders.

One of the histopathology figures of the article "Regulation of p21 during diabetes-associated stress of the endoplasmic reticulum." by Mihailidou C, Chatzistamou I, Papavassiliou AG, Kiaris H. in the journal *Endocr Relat Cancer*. 22(2):217-28. doi: 10.1530/ERC-15-0018. 2015 was featured in the cover of the October 2015 issue of *Endocrine Related Cancer*.



Catherine Dong who is currently studying medicine at MUSC, presented her undergraduate research carried out here at PMI with Dr. Hegde (Dr. Nagarkatti's group), at the 2015 MUSC Research Day, and won the 2<sup>nd</sup> Place award for her talk.

Amy Harrington (Biochemistry & Molecular Biology Major) received a USC Magellan Scholar Award for (\$3000). Amy is carrying out her undergraduate research with mentor Dr. Hegde in Dr. Nagarkatti's group.

## Publications:

Londono-Renteria B, Troupin A, Conway MJ, Vesely D, Ledizet M, Roundy CM, Cloherty E, Jameson S, Vanlandingham D, Higgs S, Fikrig E, Colpitts TM. Dengue Virus Infection of *Aedes aegypti* Requires a Putative Cysteine Rich Venom Protein. *PLoS Pathog*. 2015 Oct 22;11(10):e1005202.

Londono-Renteria B, Drame PM, Weitzel T, Rosas R, Grippin C, Cardenas JC, Alvares M, Wesson DM, Poinsignon A, Remoue F, and Colpitts TM. An. *gambiae* gSG6-P1 evaluation as a proxy for human-vector contact in the Americas: a pilot study. *Parasit Vectors*. 2015 Oct 13;8:533.

Lo AS, Merrell DS, Lei H, Sardi A, McAvoy T, Testerman TL. A Novel Member of Chitinophagaceae Isolated from a Human Peritoneal Tumor. *Genome Announc*. 2015 Nov 12;3(6).

Testerman, T.L. Fulfilling the Promise of Microbiomics to Revolutionize Medicine. *Journal of Microbiology and Experimentation*. 2015; 2(3):00050.

Sido JM, Nagarkatti PS, Nagarkatti M.  $\Delta^9$ -Tetrahydrocannabinol attenuates allogeneic host-versus-graft response and delays skin graft rejection through activation of cannabinoid receptor 1 and induction of myeloid-derived suppressor cells. *J Leukoc Biol*. 2015 Sep;98(3):435-47.

Shamran HA, Ghazi HF, Al-Salman A, Al-Juboory AA, Taub DD, Price RL, Nagarkatti M, Nagarkatti PS, Singh UP. Single Nucleotide Polymorphism in IL-10, IL-12p40, and IL-13 Genes and Susceptibility to Glioma. *Int J Med. Sci*. 2015; 19 (10): 790-796.

Murphy EA, Velazquez KT, Herbert KM. Influence of high-fat diet on gut microbiota: a driving force for chronic disease risk. *Curr Opin Clin Nutr Metab Care* 2015; 18(5):515-20.

Adams SA, Wirth MD, Khan S, Murphy EA, Heiney SP, Davis LC, Davis B, Drayton RF, Hurley TG, Blair SM, Hebert JR. The association of C-reactive protein and physical activity among African Americans. *Preventative Medicine* 2015; 77:137-40.

Chakrabarti M, Ray SK. Synergistic anti-tumor actions of luteolin and silibinin prevented cell migration and invasion and induced apoptosis in glioblastoma SNB19 cells and glioblastoma stem cells. *Brain Res*. 2015 Dec 10;1629:85-93.

Chakrabarti M, Ray SK. Direct transfection of miR-137 mimics is more effective than DNA demethylation of miR-137 promoter to augment anti-tumor mechanisms of delphinidin in human glioblastoma U87MG and LN18 cells. *Gene*. 2015 Nov 15;573(1):141-152.

Mohammad RM, Muqbil I, Lowe L, Yedjou C, Hsu HY, Lin LT, Siegelin MD, Fimognari C, Kumar NB, Dou QP, Yang H, Samadi AK, Russo GL, Spagnuolo C, Ray SK, Chakrabarti M, Morre JD, Coley HM, Honoki K, Fujii H, Georgakilas AG, Amedei A, Niccolai E, Amin A, Ashraf SS, Helferich WG, Yang X, Boosani CS, Guha G, Bhakta D, Ciriolo MR, Aquilano K, Chen S, Mohammed SI, Keith WN, Bilslund A, Halicka D, Newsheen S, Azmi AS. Broad targeting of resistance to apoptosis in cancer. *Semin Cancer Biol.* 2015 Dec;35 Suppl:S78-S103.

Block KI, Gyllenhaal C, Lowe L, Amedei A, Amin AR, Amin A, Aquilano K, Arbiser J, Arreola A, Arzumanyan A, Ashraf SS, Azmi AS, Benencia F, Bhakta D, Bilslund A, Bishayee A, Blain SW, Block PB, Boosani CS, Carey TE, Carnero A, Carotenuto M, Casey SC, Chakrabarti M, Chaturvedi R, Chen GZ, Chen H, Chen S, Chen YC, Choi BK, Ciriolo MR, Coley HM, Collins AR, Connell M, Crawford S, Curran CS, Dabrosin C, Damia G, Dasgupta S, DeBerardinis RJ, Decker WK, Dhawan P, Diehl AM, Dong JT, Dou QP, Drew JE, Elkord E, El-Rayes B, Fingleton MA, Felsher DW, Ferguson LR, Fimognari C, Firestone GL, Frezza C, Fujii H, Fuster MM, Generali D, Georgakilas AG, Gieseler F, Gilbertson M, Green MF, Grue B, Guha G, Halicka D, Helferich WG, Heneberg P, Hentosh P, Hirschey MD, Hofseth LJ, Holcombe RF, Honoki K, Hsu HY, Huang GS, Jensen LD, Jiang WG, Jones LW, Karpowicz PA, Keith WN, Kerkar SP, Khan GN, Khatami M, Ko YH, Kucuk O, Kulathinal RJ, Kumar NB, Kwon BS, Le A, Lea MA, Lee HY, Lichtor T, Lin LT, Locasale JW, Lokeshwar BL, Longo VD, Lyssiotis CA, MacKenzie KL, Malhotra M, Marino M, Martinez-Chantar ML, Matheu A, Maxwell C, McDonnell E, Meeker AK, Mehrmohamadi M, Mehta K, Michelotti GA, Mohammad RM, Mohammed SI, Morre DJ, Muralidhar V, Muqbil I, Murphy MP, Nagaraju GP, Nahta R, Niccolai E, Newsheen S, Panis C, Pantano F, Parslow VR, Pawelec G, Pedersen PL, Poore B, Poudyal D, Prakash S, Prince M, Raffaghello L, Rathmell JC, Rathmell WK, Ray SK, Reichrath J, Rezazadeh S, Ribatti D, Ricciardiello L, Robey RB, Rodier F, Rupasinghe HP, Russo GL, Ryan EP, Samadi AK, Sanchez-Garcia I, Sanders AJ, Santini D, Sarkar M, Sasada T, Saxena NK, Shackelford RE, Shantha Kumara HM, Sharma D, Shin DM, Sidransky D, Siegelin MD, Signori E, Singh N, Sivanand S, Sliva D, Smythe C, Spagnuolo C, Stafforini DM, Stagg J, Subbarayan PR, Sundin T, Talib WH, Thompson SK, Tran PT, Ungefroren H, Vander Heiden MG, Venkateswaran V, Vinay DS, Vlachostergios PJ, Wang Z, Wellen KE, Whelan RL, Yang ES, Yang H, Yang X, Yaswen P, Yedjou C, Yin X, Zhu J, Zollo M. Designing a broad-spectrum integrative approach for cancer prevention and treatment. *Semin Cancer Biol.* 2015 Dec;35 Suppl:S276-304.

Wedman P, Aladhami A, Beste M, Edwards MK, Chumanevich A, Fuseler JW, Oskeritzian CA. A New Image Analysis Method Based on Morphometric and Fractal Parameters for Rapid Evaluation of In Situ Mammalian Mast Cell Status. *Microsc Microanal.* 2015 Dec;21(6):1573-1581.

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Monsanto SP, Edwards AK, Zhou J, Nagarkatti P, Nagarkatti M, Young SL, Lessey BA, Tayade C. Surgical removal of endometriotic lesions alters local and systemic proinflammatory cytokines in endometriosis patients. *Fertil Steril.* 2015 Dec 14. pii: S0015-0282(15)02131-7.

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Velázquez KT, Enos RT, McClellan JL, Cranford TL, Chatzistamou I, Singh UP, Nagarkatti M, Nagarkatti PS, Fan D, Murphy EA. MicroRNA-155 deletion promotes tumorigenesis in the azoxymethane/dextran sulfate sodium model of colon cancer. *Am J Physiol Gastrointestinal Liver Physiol.* 2016 Jan 7:ajpgi.00326.2015. doi: 10.1152/ajpgi.00326.2015. [Epub ahead of print].

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Singh UP, Singh, NP, Murphy EA, Robert L. Price, Fayad R, Mitzi Nagarkatti, & Prakash S. Nagarkatti. Chemokine and Cytokine levels in inflammatory bowel disease patients. *Cytokine*. 2016; 77: 44-49.

Singh NP, Singh UP, Rouse M, Zhang J, Chatterjee S, Nagarkatti PS, Nagarkatti M. Dietary Indoles Suppress Delayed-Type Hypersensitivity by Inducing a Switch from Proinflammatory Th17 Cells to Anti-Inflammatory Regulatory T Cells through Regulation of MicroRNA. *J Immunol*. 2016 Feb 1;196(3):1108-22.

Guan H, Singh UP, Rao R, Mrelashvili D, Sen S, Hao H, Zumbun EE, Singh NP, Nagarkatti PS, Nagarkatti M. Inverse Correlation of Expression of miR-140-5p with Progression of Multiple Sclerosis and Differentiation of Encephalitogenic Th1 cells. *Immunology*. 2016 Jan 18. doi: 10.1111/imm.12583. [Epub ahead of print]

Elliott DM, Nagarkatti M, Nagarkatti PS. 3,3'-diindolylmethane ameliorates staphylococcal enterotoxin B-induced acute lung injury through alterations in the expression of microRNA that target apoptosis and cell cycle arrest in activated T cells. *J Pharmacol Exp Ther*. 2016 Jan 27. pii: jpet.115.226563. [Epub ahead of print]

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Dattaroy D, Seth RK, Das S, Alhasson F, Chandrashekar V, Michelotti GA, Fan D, Nagarkatti M, Nagarkatti P, Diehl AM, Chatterjee S. Sparstolonin B attenuates early liver inflammation in experimental NASH by modulating TLR4-trafficking in lipid rafts via NADPH oxidase activation. *Am J Physiol Gastrointest Liver Physiol*. 2015 Dec 30;ajpgi.00259.2015. doi: 10.1152/ajpgi.00259.2015. [Epub ahead of print]

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Gribble MO, Karimi R, Feingold BJ, Nyland JF, O'Hara TM, Gladyshev MI, Chen CY. Mercury, selenium and fish oils in marine food webs and implications for human health. *J Mar Biol Assoc U.K.* 2016 Feb;96(1):43-59. Epub 2015 Sep 8.

## Presentations:

Piper Wedman was invited to give a talk at the 50<sup>th</sup> SouthEastern Regional Lipid Conference, held in Cashiers, NC, November 11-13, 2015, entitled "Ceramide profiling in preclinical stages of atopic dermatitis: relevance to early pathogenic apoptosis?" also authored by Katherine M. Castleberry, Alena Chumanevich, John W. Fuseler and Carole A. Oskeritzian.

Dr. John W. Fuseler was invited to give a poster presentation at the 50<sup>th</sup> SouthEastern Regional Lipid Conference, held in Cashiers, NC, November 11-13, 2015, entitled "Mast cells and sphingosine-1-phosphate are linked to early inflammatory remodeling in preclinical atopic dermatitis", also authored by Piper Wedman, Ahmed Aladhami, Alena Chumanevich, and Carole A. Oskeritzian.

Velazquez KT, Enos RT, Cranford TL, McClellan JL, Nagarkatti M, Murphy EA. MicroRNA-155 deficiency accelerates adipose tissue fibrosis in a mouse model of diet-induced obesity. Keystone Symposia Conference: New insights into Molecular Mechanisms and Therapeutic Strategies, Kyoto Japan, 2015.

Kayla Penta, Jennifer Woodruff, Anne Perez, and Jennifer F Nyland. Effect of arsenic on type 2 diabetes. Carolina Women's Health Research Forum. October 2015.

Ines Silva, Jennifer Nyland, and Ellen Silbergeld. Coincident risks of mercury and malaria in mining regions of the Americas. International Society of Environmental Epidemiology. São Paulo, Brazil. 2015.

Dong C, Hegde VL, Nagarkatti, PS, Nagarkatti M. The anti-inflammatory effect of Resveratrol in a murine model of autoimmune hepatitis. Medical University of South Carolina (MUSC) Research Day symposium, November 13, 2015. Charleston, SC (Oral presentation 2<sup>nd</sup> Place winner).

Ray SK, Chakrabarti M, Das BC. microRNA mediated augmentation of therapeutic effects of synthetic boronated in mono-culture and co-culture models of spinal cord injury. Presented in the Annual Meeting of the Society for Neuroscience (SfN), October 17-21, Chicago, IL. Program No. 590.26/Poster No. H19. 2015 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2015.

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Andrea Londono-Renteria and Andrea Troupin (Dr. Colpitts laboratory) presented at the American Society of Tropical Medicine and Hygiene General Meeting in October. Berlin received a postdoctoral fellow travel award.

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Farmaki E., Chatzistamou I, Kaza V., Kiaris H. A self-sustained gradient of CCL8 drives breast cancer metastasis. An AACR Special Conference on Tumor Metastasis, November 30-December 3, 2015, Austin Texas.

Farmaki E, Chatzistamou I, Kaza V, Kiaris H. A CCL8 gradient drives breast cancer metastasis. Carolina Women's Health Research Forum, November 2015, Columbia SC.

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Hegde VL, Nagarkatti P, and Nagarkatti M. MicroRNA Regulatory Circuits and Myeloid Cells In Immune Dysregulation By Cannabinoids. 2015 Carolina Cannabinoid Collaborative meeting, November 13-15, 2015. National Institute on Alcohol Abuse and Alcoholism (NIAAA), National Institutes of Health (NIH), Rockville, MD (Abstract selected for talk).

Das, S., Seth, R.K., Chandrashekar, V., Alhasson, F., Dattaroy, D., Michelotti, G.A., Nagarkatti, P., Bell, P.D., Liedtke, W.B., Diehl, A.M., Chatterjee, S., Nagarkatti, M. TRPV4 deficiency enhances TLR4 recruitment to lipid rafts exhibiting exacerbated stellate cell activation and fibrosis in experimental nonalcoholic steatohepatitis. Annual Meeting of the American Association for the Study of Liver Diseases (AASLD), 2015.

Seth, R.K., Das, S., Dattaroy, D., Alhasson, F., Bell, P.D., Michelotti, G.A., Nagarkatti, M., Nagarkatti, P., Liedtke, W.B., Diehl, A.M., Chatterjee, S., TRPV4 regulates inflammation and Kupffer cell activation in nonalcoholic steatohepatitis by attenuation of CYP2E1-mediated oxidative stress. Annual Meeting of the American Association for the Study of Liver Diseases (AASLD), 2015.