

The van Breemen Group and Chicago Mass Spectrometry Laboratory 2016 Newsletter

Highlights of 2015

September, 2016
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The most exciting event of 2015 was the renewal of our NIH grant P50 AT000155-15 supporting the UIC/NIH Center for Botanical Dietary Supplements Research. Begun in 1999, this NIH grant was renewed for the

period 2015 through 2020. Although not announced until early this year, Richard van Breemen was the recipient of the 2015 University of Illinois at Chicago Distinguished Researcher of the Year in the Life Sciences. In other

news, our group published 10 papers in 2015 and presented 20 papers at meetings. Other highlights include adding a new postdoctoral fellow and graduate student awards. Read on for details of these events and more.

Inside this issue:

New lab members and 2015 group photograph

Grants, awards, mass spectrometers, and press

2015 Publications 4



van Breemen Lab Group members attending the UIC 2015 Researcher of the Year Ceremony. *Left to right:* Guannan Li, Luying Chen, Tristesse Burton, Emily Rue, Alyssa Tonsing-Carter, Zane Hauck, Richard van Breemen, Daniel Nosal, Lingyi Huang, Michael Rush, Ruth Muchiri.

van Breemen named UIC Researcher of Year

On February 25th, 2016, Richard van Breemen was recognized as the 2015 University of Illinois at Chicago Distinguished Researcher of the Year in the Basic Life Sciences. A UIC News report related to this award may be found at the following link:

<https://news.uic.edu/can-natural-products-help-prevent-treat-disease>

Attending the event were the new UIC Chancellor Michael Amiridis, new UIC Provost Susan Poser, new UIC Vice Chancellor for Health Affairs Robert Barish, Vice Chancellor

for Research Mitra Dutta, and Dean of the College of Pharmacy Jerry Bauman. This was a great opportunity to meet the new UIC leadership.

The award presentation and reception were attended by most members of the van Breemen laboratory (photo above).

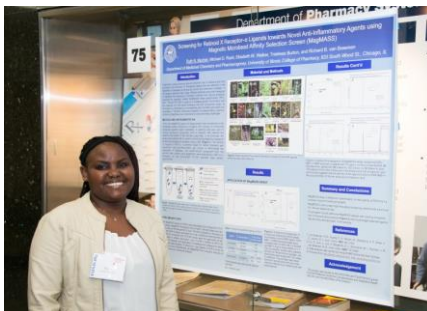
Lab Member News 2015

New Graduate Student



Emily Rue joined UIC in the fall of 2015. Previously, she earned a B.S. in forensics from the University of New Haven and gained GC-MS experience while working in a forensics laboratory in the greater New York City area. In the van Breemen laboratory, Emily is carrying out ion mobility mass spectrometry and LC-MS/MS studies of proanthocyanidins.

New Postdoctoral Fellow



Taking over for Elisabeth Walker on the ultra-PUFMS project is postdoctoral fellow Ruth Muchiri. A native of Nairobi, Kenya, Ruth is a 2015 graduate of Michigan State University, where she studied bio-organic and analytical chemistry with Prof. Kevin Walker. She has expertise in synthesis, biosynthesis, and analysis of organic compounds.

Graduating Postdoctoral Fellow



After working on “ultra-PUFMS” (high-throughput pulsed ultrafiltration LC-MS screening) in the lab since 2014, postdoctoral fellow Dr. Elisabeth Walker joined Thermo Scientific in the Boston area as a Spectrometry Applications Specialist. The photo above left, taken at the 2015 ASMS conference in St. Louis, shows Elisabeth with lab alumnus Linlin Dong and current students Mike Rush and Zane Hauck.



The 2015 van Breemen Lab Group wearing our first lab T-shirts, “Breaking Bonds,” in the style of *Breaking Bad*. Featured on the back is the product ion tandem mass spectrum of resveratrol and, “fragmenting small molecules in Chicago since 1994.” Special thanks to Elisabeth Walker and Michael Rush for designing the 2015 lab T-shirt.

New Grants and Mass Spectrometers

1. NIH grant P50 AT000155 supporting our UIC/NIH Center for Botanical Dietary Supplements Research has been renewed for another 5 years (years 15 through 20). We celebrated with a party in the Dorothy Bradley Atkins Medicinal Plant Garden adjacent to the College of Pharmacy building. Our Botanical Center organizational structure remains unchanged over the previous funding period (Guido Pauli leads the botanical project; Judy Bolton the bioassay project; Dejan Nikolic co-leads the Analytical Core; and Principal Investigator Richard van Breemen leads the

safety and drug-botanical interaction project. What is new going forward is that our safety studies have been expanded beyond the preclinical phase to include clinical trials of drug interactions with hops, red clover and licorice.

Although there had been 5 botanical centers supported by the NIH Office of Dietary Supplements and the National Center for Complementary and Integrative Health, now there are only 3 (the others based at LSU and Mount Sinai). Details about all 3 centers may be viewed on the NIH website:

https://ods.od.nih.gov/Research/Dietary_Supplement_Research_Centers.aspx

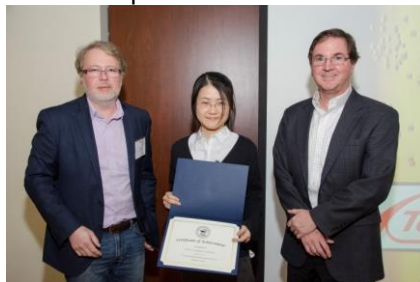
2. In our continuing collaboration with Shimadzu, we are fortunate to be among the first in the world to be equipped with their new LCMS-8060 triple quadrupole mass spectrometer and Nexera UHPLC system. Sharing the record with the LCMS-8050 as the fastest mass spectrometer in terms of scanning, SRM and polarity switching, the LCMS-8060 is even more sensitive. Installed during June 2015, we were able to show data from the 8060 at scientific meetings by the fall.

Awards

1. At the 17th Annual College of Pharmacy Graduate Student Awards in 2015, Pharmacognosy graduate student Tristesse Burton received the Charles Wesley Petranek Memorial Scholarship.



2. Also on Research Day 2015, Medicinal Chemistry graduate student Guannan Li received the Professor Ludwig Bauer Scholarship.



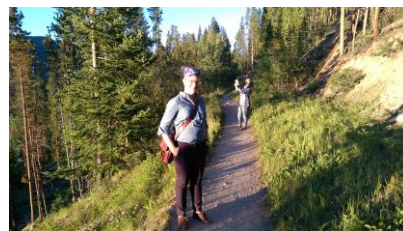
Guannan receives the Bauer Scholarship accompanied by Profs. Petukhov and van Breemen.

3. Michael Rush received a graduate student travel award to present at the American Society for Mass Spectrometry annual conference, May 31, 2015, St. Louis MO; and Lingyi Huang, received a young investigator travel award from the Mass Spectrometry Applied to the Clinical Laboratory to attend their meeting in San Diego, CA, March 28, 2015.

4. Tristesse Burton was the recipient of an Anne S. Chatham Fellowship in Medical Ethnobotany from the Garden Club of America.

Meetings, Seminars and Press

Our group presented 20 talks, seminars and posters at national and international meetings in 2015. We made 9 presentations at the annual meeting of the American Society of Pharmacognosy in Copper Mountain, CO. At the 63rd Conference on Mass Spectrometry and Allied Topics in St. Louis, MO, we had 4 papers, and we made 2 presentations at the 54th Meeting of the Phytochemical Society of North America in Urbana-Champaign, IL. The remaining presentations were mostly seminars at a variety of locations including the University of Florida, the University of Minnesota and Michigan State University.



Richard, Guannan Li and Alyssa Tonsing-Carter during the ASP meeting in Copper Mt, CO.

Richard van Breemen was interviewed by National Public Radio on the program *Here and Now*, February 3, 2015, in a program entitled, "When it comes to nutritional supplements, it's 'buyer beware.'"

<http://hereandnow.wbur.org/2015/02/03/nutritional-supplements-fda>

Richard B. van Breemen, Ph.D.

Department of Medicinal Chemistry and Pharmacognosy
 University of Illinois College of Pharmacy
 833. S. Wood St., Chicago, IL 60612
Phone: 312-996-9353; **Fax:** 312-996-7107
E-mail: Breemen@uic.edu

We're on the Web!
<http://www.uic.edu/labs/breemen/>

2015 Publications

Since 1999, our lab has published between 10 and 20 papers per year. Last year, we published 10 peer-reviewed papers including one book chapter as indicated below.

1. Pituch KC, Moyano AL, Lopez-Rosas A, Marottoli FM, Li G, Hu C, van Breemen R, Månsson JE, Givogri MI. Dysfunction of platelet-derived growth factor receptor α (PDGFR α) represses the production of oligodendrocytes from arylsulfatase A-deficient multipotential neural precursor cells. *J. Biol. Chem.* 290, 7040-7053 (2015).
2. Huang K, Huang L, van Breemen RB. Detection of reactive metabolites using isotope-labeled glutathione trapping and simultaneous neutral loss and precursor ion scanning with ultra-high-pressure liquid chromatography triple quadrupole mass spectrometry. *Anal. Chem.* 87, 3646-3654 (2015).
3. Cantuti-Castelvetri L, Maravilla E, Marshall M, Tamayo T, D'auria L, Monge J, Jeffries J, Sural-Fehr T, Lopez-Rosas A, Li G, Garcia K, van Breemen R, Vite C, Garcia J, Bongarzone ER. Mechanism of neuromuscular dysfunction in Krabbe disease. *J. Neurosci.* 35, 1606-1616 (2015).
4. Parvinian A, Casadaban LC, Hauck ZZ, van Breemen RB, Gaba RC. Pharmacokinetic study of conventional sorafenib chemoembolization in a rabbit VX2 liver tumor model. *Diagn. Interv. Radiol.* 21, 235-240 (2015).
5. Gann PH, Deaton RJ, Rueter EE, van Breemen RB, Nonn L, Macias V, Han M, Ananthanarayanan V. A Phase II randomized trial of lycopene-rich tomato extract among men with high-grade prostatic intraepithelial neoplasia. *Nutr. Cancer.* 67, 1104-1112 (2015).
6. Li G, Huang K, Nikolic D, van Breemen RB. High-throughput cytochrome P450 cocktail inhibition assay for assessing drug-drug and drug-botanical interactions. *Drug Metab. Dispos.* 43, 1670-1678 (2015).
7. Simmer C, Chen S-N, Anderson J, Lankin DC, Phansalkar R, Krause E, Dietz B, Bolton J, Nikolic D, van Breemen RB, Pauli GF. Botanical integrity: The importance of the integration of chemical, biological, and botanical analyses, and the role of DNA barcoding. *HerbalGram*, 106, 56-58 (2015).
8. van Breemen RB. Development of safe and effective botanical dietary supplements. *J. Med. Chem.* 58, 8360-8372 (2015).
9. Hajirahimkhan A, Simmler C, Dong H, Lantvit DD, Li G, Chen SN, Nikolic D, Pauli GF, van Breemen RB, Dietz BM, Bolton JL. Induction of NAD(P)H:quinone oxidoreductase 1 (NQO1) by *Glycyrrhiza* species used for women's health: differential effects of the Michael acceptors isoliquiritigenin and licochalcone A. *Chem. Res. Toxicol.* 28, 2130-2141 (2015).
10. Nikolić D, Lankin DC, Cisowska T, Chen S-N, Pauli GF, van Breemen RB. Chapter 2. Nitrogen-containing constituents of black cohosh: Chemistry, structure elucidation, and biological activities. In *The Formation, Structure and Activity of Phytochemicals. Recent Advances in Phytochemistry 45*. Ed. By Jetter R. Springer International Publishing, Basel, Switzerland, pp 31-75, 2015. ISBN 978-3-319-20397-3