CINTACS

Newsletter of the Cincinnati Section of the American Chemical Society

December, 2003
Vol. 41, No. 3

Meeting Calendar

Wed., Dec. 10	Ken Setchell, UC at Xavier University
Wed., Jan. 14	Isiah Warner, LSU at Embassy Suites
Wed., Feb. 25	Chemist of the Year at Givaudan Flavors
Wed., March 24	Don Tomalia at Miami University
Thurs. Apr. 22	Arthur Ford, USGS at NKU
Fri. May 21	Party Night!

In this issue

December Monthly Meeting

Estrogenic Properties of Soy Isoflavones

Professor Kenneth Setchell
College of Medicine
University of Cincinnati

Abstract

Interest in the nutritional value of phytoestrogens has grown at an unprecedented rate following the wealth of scientific data showing that these bioactive non-nutrients possess potent and wide-ranging biological activity. While phytoestrogens are ubiquitous to the plant kingdom, several plants and plant-based foods are notorious for their relatively high content of phytoestrogens. These include foods made from or incorporating soybeans or flaxseed, and the nutritional values and properties of such products have been rapidly exploited by the food industry.

Soy-based foods, which contain the isoflavones daidzein

(Continued on page 8)

About the Speaker

A native of Ireland, Ken Setchell received his PhD in steroid biochemistry from the University of London in 1973. After doing postdoctoral work at the Karolinska Institute on the application of mass spectrometry to clinical and biomedical problems in the steroid hormone field, he joined the Medical Research Council's Clinical Research Centre, Harrow, Middlesex, UK. Here, he continued his research on steroids and expanded into cholesterol and bile acid metabolism as it related to gastrointestinal diseases. This work

(Continued on page 11)

THE CINTACS NEWSLETTER

Vol. 41, No. 3 Dec., 2003

Editor.....Bruce S. Ault
Advertising..... …..…..Ed Hunter

CINTACS is published eight times a year (October through May) by the Cincinnati Section of the American Chemical Society. The submission deadline will be approximately November 26 for the January, 2004 issue. Electronic submission is strongly preferred, except for original photos. All materials should be sent to:

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From the Chair

In what is becoming a tradition, our December meeting will be held at Xavier University. We have tried to set this meeting up to offer something of interest to each member of the Section. The after-dinner speaker will be Ken Setchell of the UC College of Medicine, who will talk on his award-winning research on the estrogenic properties of soy. In addition, we will have three Discussion Group meetings before dinner: Rick Danheiser, from MIT, will give a talk to the Organic Discussion Group; the Analytical Discussion will hear from Greg Swain of Michigan State University; and the Colloid Discussion Group will host Theresa Reineke of UC. Details of each talk are given in the following pages. **If none of these topics is of sufficient interest to entice you to come to the meeting, please let me know what we can do to get you to attend in the future.**

Our thanks go to the sponsor of this meeting—Procter & Gamble Pharmaceuticals. The meeting chair is Dan McLoughlin, whom we thank for arranging for us to have the beautiful Conaton Presidential Ballroom for the social hour and dinner, as well as appropriate meeting rooms for the Discussion Groups.

Elsewhere in this issue, you will see an article by Gloria Story, describing the Section's efforts for National Chemistry Week in October. As one component of NCW, Section members entertained and educated hundreds of students (and their parents) at 40 area public libraries. This year for the first time, I participated at one of the libraries and enjoyed it thoroughly. I would encourage anyone who is interested to consider doing this next year—it's easy, not very time consuming, and fun! Again, thanks to Gloria for her efforts in leading our award-winning NCW activities.

Best wishes to all for a happy holiday season!

Joel Shulman
joel.shulman@uc.edu

Visit the Section's Home Page

http://www.che.uc.edu/acs

December Monthly Meeting
December 10, 2003
Conaton Board Room, Room 201 Schmidt Hall
Xavier University

Sponsored by Procter and Gamble Pharmaceuticals

Featured Speaker
Dr. Kenneth Setchell

Program

5:30 – 6:30 Organic Chemistry Discussion Group – Albers Hall, Room 103 (see page 6 for details)
Analytical Chemistry Discussion Group – Alter Hall, Room 318 (see page 4 for details)
Colloid Chemistry Discussion Group – Alter Hall, Room 321 (see page 5 for details)

5:30 – 7:00 Registration, Conaton Board Room, 2nd Floor, Schmidt Hall

6:00 – 7:00 Social (Cash Bar), Conaton Board Room

7:00 – 8:00 Dinner, Conaton Board Room ($25.00 or $12.00 for students, emeritus, unemployed and new members)

Pan Seared Chicken Breast with Hunter Sauce
Garden Greens Salad with Italian Vinaigrette
Wild Rice Pilaf, Fresh Seasonal Vegetable Medley
Fresh Baked Bread
Chocolate Mousse with Raspberry Sauce, Whipped Cream and Chocolate Shavings
Coffee, Tea.

Vegetarian Entrée Available upon request when making reservations

8:00 – 9:00 Meeting and Featured Speaker, Dr. Kenneth Setchell
"Estrogenic Properties of Soy Isoflavones"

Directions:
The Xavier University Conaton Presidential Board Room is located on the second floor of Schmidt Hall. Parking is provided free **with the enclosed Parking Pass (see page 4)** at the F&W Center on Dana Avenue across the street from Schmidt Hall (the second building on the left as you walk up Heald Avenue off of Dana onto the Academic Mall) Albers Hall is the second building to the north of Schmidt Hall, further along the Academic Mall. Alter Hall is on the right, across the Academic Mall from Albers Hall.

I-71: Exit at Dana Avenue exit. Proceed west on Dana Avenue past Ledgewood Drive. As the road begins a slight turn, the F&W parking area will be on the left before you reach Victory Parkway.
I-75: Exit at Mitchell Avenue. Proceed east on Mitchell Avenue, crossing over Reading Road. Continue to Dana Avenue and turn left. Just after crossing Victory Parkway, the entrance to F&W parking area will be on the right.
Rt. 562: Exit the Norwood Lateral at Reading Road. Continue in the left lane of Reading Road to Victory Parkway. Merge left onto Victory Parkway at the light. Continue to Dana Avenue. Turn left onto Dana Avenue. The entrance to F&W parking area will be on the right in about half a block.

Analytical Discussion Group

Conductive Diamond Thin Films: Advanced Electrodes for Electrochemical Technologies

Professor Greg M. Swain
Michigan State University

Electrically conducting diamond provides scientists and engineers with a new electrode material that meets the requirements for a wide range of applications. No other material shows as much versatility as an electrode as does electrically conducting, chemical vapor deposited (CVD) diamond. The material can be used in electroanalysis to provide low detection limits for analytes with superb precision and stability; for high current density electrolysis (1-10 A/cm^2) in aggressive solution environments without any morphological or microstructural degradation; as a corrosion-resistant electrocatalyst support; and as an optically transparent electrode (OTE) for spectroelectrochemical measurements.

Diamond's properties include low background current, dimensional stability and corrosion resistance, good responsiveness without pretreatment, fouling resistance, and optical transparency. The presentation will give a broad overview of some of the areas of electrochemistry in which microcrystalline and nanocrystalline diamond thin-films are being successfully applied.

About the Discussion Group Leader

Greg M. Swain is a Professor in the Department of Chemistry at Michigan State University. He received a B.A. (Chemistry) in 1987 from the University of Texas at Dallas and a Ph.D. (Analytical Chemistry) in 1991 from the University of Kansas under the direction of Professor Theodore Kuwana. After completing postdoctoral fellowships at Auburn University (Space Power Institute) and Tohoku University in Sendai, Japan, he joined the Department of Chemistry at Utah State University where he was a faculty member from 1994-2000. He joined the faculty at Michigan State University in 2000. His research interests include carbon electrode materials, analytical electrochemistry, spectroelectrochemistry, chemically modified electrodes, separation science, and electrochemical-based decontamination and purification of water supplies.

Parking Pass—cut and place on passenger side of dashboard
[note: directions to Xavier University are on the reverse side of this page]

XAVIER UNIVERSITY
Conaton Presidential Board Room
Second floor Schmidt Hall
Temporary Reserved Parking Permit
Valid for American Chemical Society Meeting
F&W PARKING AREA
December 10, 2003

CARD MUST BE DISPLAYED ON PASSENGER SIDE OF DASHBOARD

Colloid Discussion Group

Synthetic Design and Characterization of Polyamides for DNA Delivery

Professor Theresa Reineke
University of Cincinati

One of the greatest challenges to the successful application of gene therapy is the development of a suitable vehicle to deliver DNA therapeutics. Polymeric materials are currently being investigated for gene delivery and offer many advantages over viral systems. For example, unlike viruses, synthetic materials may not induce immune and inflammatory responses, they have a lower cost of synthesis, and can carry an unlimited amount and size of DNA. However, polymeric delivery systems must also be designed to mimic the positive aspects of viruses; they must compact the genetic material into colloidal particles that can be uptaken by cells, protect the DNA therapeutic from enzymatic damage during cellular transport, and provide the possibility of targeting the delivery to specific cell and tissue types.

Several studies have shown that polycations can bind and compact DNA into colloidal nanoparticles that are readily endocytosed by many cell types with varying degrees of delivery efficiency and toxicity. However, two important problems have arisen: *i)* some of the most efficient nonviral agents have been found to be toxic, and *ii)* nonviral vectors have lower DNA delivery efficiency than viral vectors. In addition, previous studies indicate that the chemical structure of the polymer affects the toxicity and delivery efficiency to a large degree, although it is frequently not understood why this occurs. Here, we have created a series of polymers that will allow us to probe the structure-property relationships for synthetic DNA delivery agents. We have created a series of twelve carbohydrate-containing polyamides that differ in the amount and stereochemistry of the hydroxyl groups and the number of secondary amines along the polymeric backbone to elucidate how subtle structural changes in these materials affect DNA delivery efficiency and toxicity. We are excited to report that we have discovered that almost all of the polymers bind and compact DNA into colloidal nanoparticles (according to dynamic light scattering and TEM experiments) that facilitate intracellular DNA transport. The synthesis, structural characterization, and DNA-binding and compaction properties of these materials will be presented. Furthermore, the toxicity and DNA delivery efficiency of these synthetic carriers with mammalian cell lines will be discussed.

About the Discussion Group Leader

Theresa Reineke is an Assistant Professor of Chemistry at the University of Cincinnati. She is a materials chemist with research interests in polymers for biomedical applications and luminescent materials. After receiving an undergraduate degree from the University of Wisconsin-Eau Claire in 1995, she completed her graduate studies at Arizona State University (M.S. degree) and The University of Michigan (Ph.D. degree) with Dr. Omar Yaghi studying the synthesis and characterization of metal-organic luminescent polymeric framework materials. After completing her Ph.D. in 2000, she was awarded a National Institutes of Health Fellowship to study the synthesis and biological characterization of carbohydrate-containing polymers for gene therapy in the laboratory of Dr. Mark E. Davis at the California Institute of Technology. In 2002 she joined the faculty at the University of Cincinnati. Currently, her group is studying the synthesis of carbohydrate-containing polymers and dendrimers that bind, compact, and deliver therapeutic DNA *in vitro* and *in vivo*. In addition, her group is developing new polymers for use in magnetic resonance imaging and luminescent porous molecules for use as sensors.

Cincinnati Section Meeting Sponsors 2003-2004 Program Year

October 10: University of Cincinnati, Department of Chemistry
November 12: Advanced Testing Laboratory
December 10: Procter and Gamble Pharmaceuticals
January 14: The Procter and Gamble Company
February 25: Givaudan Flavors
March 24: Marshall Wilson
April 22: Robert Laughlin
May 21: Rick Fayter

Organic Discussion Group

New Annulation and Cycloaddition Strategies for the Synthesis of Heterocyclic and Carbocyclic Compounds

Professor Rick Danheiser
Massachusetts Institute of Technology

Highly substituted carbocyclic and heterocyclic rings are key structural features in many biologically significant and commercially important compounds. Although classical synthetic approaches to such compounds have generally relied on linear substitution strategies, convergent annulation methods have recently emerged as powerful alternative strategies for the assembly of highly substituted cyclic compounds. The intrinsic convergent nature of annulation strategies facilitates the efficient assembly of highly substituted systems that would have required long, multistep routes using alternative methods. This lecture will focus on the application of highly unsaturated, conjugated molecules such as vinylketenes, conjugated enynes, and related species as building blocks for the construction of carbocyclic and heterocyclic compounds. The advantages afforded by annulation strategies will be illustrated with examples of their application in the synthesis of several biologically active natural products.

About the Discussion Group Leader

Rick Danheiser grew up in New York and California and received his undergraduate education at Columbia College. While working as an undergraduate under the direction of Professor Gilbert Stork, Dr. Danheiser developed the "Stork-Danheiser Alkylation" and employed it in a total synthesis of the spiro sesquiterpene β-vetivone. Professor Danheiser received his Ph.D. at Harvard University in 1978, under the direction of Professor E. J. Corey. Dr. Danheiser joined the faculty of the Massachusetts Institute of Technology in 1978 and at present is the Arthur C. Cope Professor of Chemistry and Associate Head of the Department. Current investigations in his laboratory involve the development of new strategies for the synthesis of complex molecules and their application in the total synthesis of natural products. Another focus of research in the Danheiser laboratory involves the development of methods for the synthesis of polycyclic aromatic compounds with unusual spectroscopic and electronic properties.

Chemical Educator's Discussion Group

The Chemical Educator's Discussion Group will meet on December 2nd at Fairfield Senior High School. The meeting will begin at 6:30 pm with a pizza party. Following announcements at 7:00 pm, Colleen Epperson will give a brief overview of the process for becoming Nationally Board Certified. Anyone who has ever thought about working to become certified should attend. Valuable information will be discussed to help make the process clearer for everyone. The remaining time will be a MAKE and TAKE! That is correct, free demo for teachers! Participants will use three 2-liter bottles to make their very own Hero's fountain (a fountain that uses potential energy of water to power a water fountain for about 10 minutes). Assembly time should be 30-45 minutes. Teachers are encouraged to RSVP via e-mail to Colleen Epperson at epperson_c@fairfield-city.k12.oh.us or phone 513-942-2999 ext 558. Bottles will be available, but bring your own and help replenish the stock. Teachers may wish to share a demo idea during the meeting. Bring enough hand outs for 30 participants. Directions to Fairfield: Take I-275 west to Route 4. Turn right onto Rt. 4 going North. Approximately 4 miles, turn right onto Holden Blvd. You will see the High School on your left. Turn left into parking lot, follow drive up to front of school. Enter through the cafeteria entrance (court yard area) and follow signs. Hope to see you on December 2nd.

Colleen Epperson
Chemistry Teacher
Fairfield High School
Ext. 137

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NCW 2003 "Earth's Atmosphere and Beyond"

Gloria Story, local NCW chair

The Cincinnati section's 2003 National Chemistry Week celebrations were a resounding success! A warm thank you to all our chemonstration volunteers, as well as all our generous donors (P&G, Givaudan, Cognis, Equistar, MeasureNet, Wright Brothers, and Jones the Florist). Without all of them and help from the ACS matching fund, our ChemLuminary award-winning Newspapers in Education (NIE) program with the Cincinnati Enquirer/ Post would not be possible, or chemonstration supplies, shipping, and goodie bags passed out at all our program events. Check out the NIE site for the great material from this year's theme: http://www.cincinnati.com/nie/chemistry03/)

Local libraries opened their doors to chemistry demonstrations, including us in their public relations media (The Cincinnati and Hamilton County Public libraries and West Chester, Mason, Salem Township, Newport, Walton, and North Dearborn libraries). The Hamilton County libraries made their flyers available to the public during Tall Stacks, conveniently scheduled right before National Chemistry Week! Our library program with the largest attendance was at the Salem Township (Morrow) library with 97, breaking their last year's record of 87! Carrie Furnish, the volunteer Salem Township demonstrator from P&G, described the evening as chaotic, but fun. Linda Ford's students from Seven Hills volunteered at both Clifton and Corryville libraries. Her photos say it all!

Seniors Christi Alexander and Lena Eastin demonstrate the acidic effects of carbon dioxide in solution at Corryville Library.

Freshmen Amy Sherman and Melissa King demonstrate the difference between endothermic and exothermic reactions at Clifton Library

Last year's event at the Cincinnati Museum Center (CMC) was pretty good, but this year's topped the charts. We provided a free 3-station program on Friday, the 24th and Saturday, the 25th, from 10 – 5:00. We were overwhelmed with over 400 participants each day. Children were given a passport, provided by our PR chair, Jamie Heimkreiter, to lead them to the three stations. MeasureNet sponsored station 1, where you could get your picture taken in a 19th century chemistry laboratory and try shooting down a pyramid of cups with an Airzooka (check them out at http://www.airzooka.net/shop/). Their passport sticker celebrated the Ohio Bicentennial. Station 2, in front of the Children's Museum and sponsored by Equistar, gave folks 4 years of age and up a chance to ride a hovercraft and everyone a peek in a microscope to study spacedust (micrometeorites). Most of the CMC volunteers, especially volunteer Boy Scouts from Troop 956 in Hamilton, OH, admitted that the hovercraft was the hit of the program. Their passport sticker celebrated 100 years of flight. Station 3, sponsored by Equistar, was located in the CMC's News Reel Theater. On Friday, Equistar demonstrator Amy Weiskittel led the atmospheric science fun with some help from James Laughlin's stu-

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dents from Cincinnati Hills Christian Academy. Saturday, students from Rebecca Stricklin's Oak Hills High School Chemistry Club worked with Al Conklin of Wilmington College, to wow and educate our visitors. MeasureNet donated 12 Airzookas that were raffled off during the demonstrations. Station 3 used NCW's "Great Chemistry is Everywhere" sticker for its spot on the passport. A fully-stamped passport earned the visitor a "Hooray for Chemistry" goodie bag with a "Celebrating Chemistry" ACS newspaper, an "Explore and Experiment" pencil, a sheet of Avogadro's temporary tattoos, and a NCW latex balloon.

Finally, a new twist to NCW in Cincinnati…celebrating Mole Day across Ohio. Michael Clingerman, NCW chair in the Columbus section invited us to join them in celebrating Mole Day at 6:02 PM on October 23rd. We decided to use this opportunity to celebrate Ohio's Bicentennial by promoting a statewide NCW event (hopefully other invited Ohio sections joined in!). To top that off, we decided to have each venue perform the "Plane Smarts" experiment described in the "Celebrating Chemistry" newspaper to acknowledge our connection to the 100 years of flight celebrations. So, it was kind of a grand slam event. Columbus' event was located at the Chemical Abstracts Service site. In Cincinnati, several libraries joined in (including North Dearborn in Indiana) as well as Boy Scout Troop 956's Thursday night meeting at the Hamilton chapter Izaak Walton League's hall. This writer unfortunately has no pictures to show of this event as she made the mistake of handing her camera to the guys while she was busy with the demonstrations.

I'd like to take this opportunity to thank each and every one of the great volunteers in the Cincinnati section, as well as the chairs I have had the pleasure of working with, Hank Greeb, Al Pinhas, and Joel Shulman, and my PR chairs, Gwen Baumann and Jamie Heimkreiter. I've really enjoyed leading the Cincinnati NCW program for the past three years. I'm passing the baton to my P&G colleague, Victor Arredondo, for our 2004 programs. Naturally, I will still be volunteering as an enthusiastic chemonstrator and I hope to see a lot more of you in next year's program!

Younger Chemists Committee: Hello….. is anyone out there??

YCC hosted a Happy Hour at Mulligan's in Hyde Park on October 14, and a paltry seven of us enjoyed free food, drinks and an exciting Yankees/Red Sox game. There are several hundred YCC types in the local section, but there seems to be general talent for remaining out of sight and uninvolved. The Younger Chemists Committee is a good way to connect with other chemists and chemistry-minded folks in the Cincinnati area. The events are not exclusively for ACS members (course we encourage participation in the local section at-large and national organization as well). If you know of someone who fits the category (age 35 and under, working in or working toward a chemistry related career), *PLEASE* let them know about YCC. The committee web page is: http://www.che.uc.edu/ycc/index.html Or, contact the chair, Joy Henderson, at Barr Laboratories, 513-731-9900 for information, questions, comments, and/or suggestions.

We are planning a career event for early Spring that will offer mock interviews, resume reviewing, and information on electronic job search resources and local companies that employ chemists. This event will be open to anyone who will be or is currently in transition between jobs or from academia (graduate and undergraduate students included). If you have recently completed a job search, and/or have suggestions or resources that may be useful for this event, please contact Joy. Any/all help is gratefully appreciated.

(Continued from page 1)
and genistein and their β-glycoside conjugates, are widely consumed in Asian countries. The relatively low incidence of hormone-dependent diseases (*e.g.*, breast and prostate cancers, cardiovascular disease, and osteoporosis) in Asia compared with Western countries led to the hypothesis that phytoestrogen-rich diets play an important role in disease prevention. Several recent dietary intervention studies examining the health effects of soy isoflavones highlight the potential importance of intestinal metabolism and particularly the formation of the metabolite equol. The pharmacokinetics, metabolism, and biological effects of these estrogen-like compounds will be addressed.

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(513) 733-2141 or
email philip_mckittrick@rohmhaas.com

(Continued from page 1)
led to the discovery of soy isoflavones in humans, and their association with soy intake, and established his research in the area of bioactive plant constituents and human nutrition and disease.

In 1984, Dr. Setchell moved to Cincinnati to become Director of a new Clinical Mass Spectrometry facility at Children's Hospital Medical Center, where he is a tenured professor in the Department of Pediatrics. He is recognized internationally as a leader in phytoestrogen and isoflavone research. One of his primary interests centers around the components and biological properties of soy foods.

Dr. Setchell is the author of more than 200 publications and four books, and has presented over 250 papers at national and international symposia. Among his honors are the 1997 Gilbride Award from the Canadian Liver Foundation for his contributions to the diagnosis and treatment of liver disease; the 1999 American Oil Chemists' Society award for his "outstanding contributions to increasing understanding and awareness of the health benefits of soy foods and soybean constituents;" and the North American Menopause Society /Genisoy 2000 Prize for "outstanding research contributions on soy and women's health." This year, Dr. Setchell received the Roche International Award for Innovative Research in Human Nutrition for his discoveries of classes of phytoestrogens.

More National Chemistry Week Photos

Freshmen Devlin Cole, Melissa King, and Vidhya Kumar join sophomore Amy Sherman demonstrate soap bubbles floating on a cushion of carbon dioxide at the Clifton Library

Senior, Liz Sidor, of Seven Hills Upper School at Corryville Library helps Chris launch a carbon dioxide-powered capsule.

American Chemical Society - Cincinnati Section

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