Synthesis of PET Radiotracers for Clinical Trials is Now Available at the Chemical Synthesis Core - The Vanderbilt Institute of Chemical Biology (VICB) Synthesis Core provides a wide range of services, including the synthesis of biological probes, affinity/fluorescent probes, peptides, and nucleotides, in addition to large-scale synthesis and medicinal chemistry support for high-throughput screens. Over the past two years, Synthesis Core staff, working with the Manning group (Vanderbilt University Center for Molecular Probes, CMP), have adopted the laboratory procedures and processes broadly defined as Current Good Manufacturing Practices (cGMP). Use of cGMP is required for the synthesis of any compound intended for use in the clinic. The adoption of cGMP enables the Core to synthesize small molecule (PET) imaging agents for early-phase (i.e., first-in-man) clinical studies.

The CMP typically utilizes fluorine-18 (18F) as the radionuclide to be incorporated into a compound such as glutamine, glucose, or a drug candidate to produce PET radiotracers. Since 18F has a half-life of ~110 min, its introduction into the molecule must be completed on the day the radiotracer will be administered to the subject undergoing the PET scan. In support of this work, the VICB Synthesis Core is responsible for the cGMP-compliant chemical synthesis, documentation, and distribution of the immediate precursor to the 18F-labeled radiotracer. To illustrate, the VICB Synthesis Core recently delivered to the CMP the immediate precursor to 18F-glutamine and a sample of cold F-glutamine. The precursor was synthesized by way of a ten-step process under cGMP conditions and provided in 100 vials (5 mg each) ready for conversion to 18F-glutamine as needed. The project was completed at a significantly reduced price relative to those quoted by outside contract research organizations. Numerous Vanderbilt investigators, including members of the VICB and the Vanderbilt Ingram Cancer Center (VICC), have benefitted from this development.

Faster & Cheaper Antibody Production: In collaboration with an outside partner, VAPR has developed a faster monoclonal production service that can generate ≥ 5 mg of purified antibody from an established hybridoma in 2 weeks. Moreover, their entire antibody production platform has been retooled to be more flexible and modular so that amounts from 100 µg to 100 mg can be produced with a sliding cost scale.

High-performance VAPR PAGE: Through the Vanderbilt Molecular and Cell Biology Resource, VAPR now sells solutions to quickly pour 10% and 12% gels of equal quality to that of any pre-poured commercial gel, but at a fraction of the cost. These can be poured into purchased disposable cassettes or into glass plate set-ups.

To date, the VICB Synthesis Core has worked exclusively with the Manning group on two cancer-related imaging agents: 18F-glutamine (tumor cell metabolism) and 18F-pyrazolopyrimidines (translocator protein ligand, TSPO). PET radiotracers can be developed for many small molecules as a means to validate target engagement of pre-clinical leads and/or biological probes. Investigators interested in developing PET radiotracers or radioactive ligands in support of basic research are encouraged to contact the VICB Synthesis Core (kwangho.kim@vanderbilt.edu).

Exciting New Services at the Vanderbilt Antibody and Protein Resource - Rabbit Monoclonal Antibodies: The Vanderbilt Antibody and Protein Resource (VAPR) is pleased to announce that it now has an end-to-end rabbit monoclonal antibody service. This service allows investigators to combine the superior qualities of the rabbit immune system with the reliability and consistency of a monoclonal antibody format.

Antibody Engineering: VAPR has dramatically expanded its antibody engineering services. They now offer everything from hybridoma variable domain sequencing to early-stage humanization, optimization, and recombinant expression of nearly any antibody format (IgG, IgM, scFv, nanobody, etc).

pRainbow: pRainbow is a lentiviral-based barcoding system that allows the investigator to track clonal populations in vitro or in vivo. Once integrated and selected, pRainbow enables cell tracking across time or treatments in seven colors, with luciferase and subcellular targeting options (nucleus, actin, etc.).

For more information, contact the VAPR (robert.carnahan@vanderbilt.edu).

The VICB Research Symposium: A Day to Share Discoveries and Ideas - The 11th Annual VICB Research Symposium was held on August 13th at Cheekwood's Botanical Hall. Students from Vanderbilt and other
universities (Notre Dame, Minnesota, Wisconsin, Indiana, Northwestern, Kentucky, Illinois, and Brown) participated in a full day of oral presentations and poster sessions. VICB Director and Associate Vice Chancellor for Research Larry Marnett kicked off the day by presenting Nichole Lareau (McLean Lab) with the inaugural Richard N. Armstrong Prize in Chemical Biology. Wilfred van der Donk, University of Illinois-Urbana-Champaign, then presented a keynote talk on the “Evolution of peptide dehydratases involved in natural product biosynthesis.”

Awards for top oral presentations went to Connor Lamberson (Porter Lab), Clifford Gee (Pomerantz Lab, U. of Minnesota), and Jessica Moore (Skaar Lab). Poster award recipients included Jonathan Hempel (Hong Lab), Charles Williams (Hong Lab), Allison Eberly (Hadjirangiskou Lab), Daniel Sprague (Johnston Lab), Matthew Surdel (Skaar Lab), Jaime Wenke (Schey Lab), Laura Lilley (Meade Lab, Northwestern U.), and Tiffany Onifer (McLean Lab). The iPad Air 2 raffle prize winner was Diana Chavez (Eichman Lab).

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Photographs and videos of the symposium are posted on the VICB web site: vanderbilt.edu/vicb/student_symposia/symposium_2015_photos.html

Poster award recipients (from left to right) Jonathan Hempel, Charles Williams, Allison Eberly, Daniel Sprague, Matthew Surdel, and Jaime Wenke. Not pictured are Laura Lilley and Tiffany Onifer.

VIBC Members Receive TIPs Funding - Congratulations to our members who received funding for their projects through the Trans-Institutional Program (TIPs) initiative. The awards were granted to Brian Bachmann and Eric Skaar (Toward the Creation of an Infrastructure for the Discovery of Bioeffectors), Roger Cone (Vanderbilt Institute for Obesity and Metabolism), Charles Manning (Vanderbilt Center for Molecular Probes), and David Wright (The Laboratories for Innovations in Global Health Technologies). The $50 million TIPs program was launched in November 2014 by Chancellor Nicholas Zeppos to foster and support cross-disciplinary research and collaboration over the next five years. We look forward to great discoveries from these exciting new projects.

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Oral Presentation award winners (from left to right) Connor Lamberson, Clifford Gee, and Jessica Moore.

Congratulations to all participants. Special recognition goes out to the CBAS (Chemical Biology Association of Students) Organizing Committee members and others who planned this event: Kim Fong, Jeannie Camarillo, James Galligan, Jennifer Benoy, James Poland, Thomas Struble, and Sarah Stow, Reese Knippel, Jacob Choby, and Wes Bauer.

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