Yale/NIDA Neuroproteomics Center Newsletter

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Call for Manuscripts!

The Center is pleased to announce that a special issue of the journal *Proteomes*, which is indexed in the Web of Science and archived in PubMed, will be devoted to neuroproteomics. This issue will be Co-Edited by Angus Nairn and Ken Williams and will contain research and review articles that cover whole proteome analysis, comparative proteomics, protein structure/function, protein post-translational modifications, protein:ligand and protein:protein interactions within normal and diseased neurological tissues. Since the huge level of cellular and sub-cellular heterogeneity in the central nervous system is the greatest obstacle standing in the way of progress towards understanding the adaptive molecular changes that underlie drug addiction and that occur in other neurological diseases, the Co-Editors are especially interested in manuscripts that describe the use of laser capture microscopy, fluorescence cytometry-related, and immuno-affinity technologies in conjunction with transgenic and viral methods to isolate and study neural cell type- and organelle-specific proteomes. Manuscripts are also especially sought that describe the development and use of technologies such as “Top-Down” and targeted MS that are applicable to neurological analyses and the use of bioinformatics approaches to integrate RNA and protein level analyses so peptide identification rates can be improved by carrying out MS/MS database searches on brain region- and cell type-specific proteomes that have been predicted based on RNA-sequencing. Article processing charges for manuscripts that describe research supported by the Cores within the Yale/NIDA Neuroproteomics Center will be covered by the Center. To reserve space for your manuscript, which will be subject to peer review and which must be submitted by June 1, 2018, please send a draft title, list of authors, and abstract to the Co-Editors.

Research in Progress (RIP) Seminar Series

The Center has scheduled the five RIP meetings shown in **Table 1**. Each meeting features two speakers and will be from 12:30–1:30 PM in Room C428 in the Sterling Hall of Medicine at 333 Cedar St., New Haven, CT. All seminars will be open to the public and will be preceded by a pizza lunch beginning at 12:20 PM. We ask all Yale and as many non-Yale Investigators and their staff, Core staff, and Pilot Project Grantees as possible to attend these important Center events.

Table 1: Research in Progress (RIP) Seminar Schedule

Meeting Date	Speaker	Title	Institution	Center Investigator	Seminar Title
10/6/2017	Marina Picciotto	Professor	Yale U.	Marina Picciotto	A Systematic Evaluation of High-affinity α4β2 Nicotinic Acetylcholine Receptor Phosphorylation
	Mary Torregrossa	Assistant Professor	U. Pittsburgh	Mary Torregrossa	Identification of Novel Regulators of Memory Extinction and Reconsolidation Using Phosphoproteomics
11/3/2017	Ryan Logan	Assistant Professor	U. Pittsburgh	NA	Identifying Novel Binding Partners of the Circadian Transcription Factor NPAS2 in Response to Cocaine and Morphine Administration
	Veronica Musante	Assoc. Res.Scientist	Yale U.	Angus Nairn	TBA
1/5/2018	Tony Cijsouw	Postdoctoral Scholar	Tufts U.	Thomas Biederer	Mapping the Proteome of the Synaptic Cleft Through Reporter Proteins
	Joachim De Klerk Uys	Assistant Professor	Med. U. South Carolina	Peter Kalivas	Quantitative Proteomic Analysis of S-glutathionylated Proteins after Cocaine Self-administration and Drug Seeking
2/2/2018	Melissa Monsey	Postdoctoral Associate	Yale U.	Jane Taylor	Profiling the Proteome of the Amygdala Following Memory Retrieval and Garcinol Administration
	Rebecca Taugher	Postdoctoral Fellow	U. Iowa	NA	The Role of Acid-sensing Ion Channel-1A in the Regulation of the Nucleus Accumbens Neuroproteome.
4/6/2018	Elsa Yan	Professor	Yale U.	NA	Structural and Functional Studies of Family B G Protein-Coupled Receptors
	Tony Koleske	Professor	Yale U.	NA	Regulation of NMDA receptor function by GluN2B phosphorylation

Targeted PRM and DIA PSD Assays

The Center's Parallel Reaction Monitoring (PRM) assay for mouse/rat PSD proteins will interrogate the level of expression of 50 proteins based on 138 "light", naturally occurring proteotypic peptides derived from these proteins and 138 matching "heavy" stable isotope-labelled internal standard (SIS) peptides that have been synthesized and are now being purified by JPT Technologies. The 50 proteins in the PSD/PRM assay include 48 proteins that Dr. Nairn's laboratory found to be enriched on going from less to more highly purified PSD preparations and two proteins that were requested by Dr. Lakshmi Devi. The use of SpikeTides™ SIS peptides that contain a chemical Qtag that allows for peptide quantitation and that is cleavable by trypsin will enable the PRM assay to "absolutely" quantify these 50 proteins. In addition, a Data Independent Acquisition (DIA) assay is also being developed that will enable the relative quantitation of 300-400 PSD proteins. For more information on these assays please contact Co-Directors Angus and Ken.

Pilot Projects Grants

The Center is delighted to announce that four Pilot Project grants have been awarded in the current Grant Year 13 (**Table 2**) and will begin accepting applications for Pilot Projects for Grant Year 14, which begins 6/1/18, on 3/1/18. The goals of this program are to encourage young investigators in our Center's laboratories to embark on careers in substance abuse research, disseminate the Center's core technologies to researchers investigating the neurobiology of addiction who are not yet using neuroproteomics technologies, and to expand the technical abilities of the Center. Pilot Grants provide short term funding to obtain preliminary data so applicants can apply for longer term grant support. These awards provide $7,500 D.C. to help pay for the cost of preparing samples for analysis in the Center's Cores and free access to all of the Center's Cores. Applications are accepted from: 1) Center investigators and 2) their Postdoctoral Fellows and higher level research staff, 3) non-Center investigators expert in substance abuse with interests in initiating research in neuroproteomics, 4) non-Center investigators with expertise in cellular and molecular aspects of neuronal signaling with interests in initiating neuroproteomics research. Awards are for one year for research that is directly related to the Center's theme of the "Proteomics of Altered Signaling in Addiction" and that propose to apply existing technologies from the Cores or to develop new technologies. Awards to non-Center investigators will be accompanied by Center membership for the term of the award. Priority will be given to new projects that are related to our Center's theme, to collaborative projects involving multiple investigators, and to Technology Development projects. The receipt deadline for applications is May 1, 2018. Additional information: **http://medicine.yale.edu/keck/nida/general/pilot_grants.aspx**. Please contact the Co-Directors, Angus & Ken, to ensure that new projects and potential pilot project proposals qualify for Center support!

Table 2: Grant Year 13 Pilot Projects

PI	Title	Institution	Center Investigator	Project Title
Lakshmi Devi & Deborah Schechtman	Professor & Associate Professor	Mt. Sinai School Medicine & U. Sao Paulo, Brazil	Lakshmi Devi	Identification of Protein Kinase C Targets Leading to Opioid Tolerance
Drew Kiraly	Assistant Professor	Mt. Sinai School Medicine	Eric Nestler	Characterization of Proteomic Changes in the Nucleus Accumbens in Response to Chronic Granulocyte-colony Stimulating Factor and Cocaine
Matthew Girgenti	Postdoctoral Associate	Yale U.	NA	Post Mortem Proteomic Characterization of Human Subgenual Prefrontal Cortex in Tobacco Abuse and PTSD
Marina Wolf & Anna Li	Professor & Postdoctoral Associate	Chicago Medical School & Behavioral Neuroscience Branch, NIDA	NA	Projection-specific Proteomics in Striatum and Its Glutamatergic Afferents in Incubation of Craving to Psychostimulants (Cocaine and Methamphetamine)

2017 Publications from the Yale/NIDA Neuroproteomics Center

As new manuscripts are accepted for publication please send them to the Co-Directors Angus and Ken. Please acknowledge the Center's grant, DA018343, in all publications that were supported by the Center's Cores.

Andrade, E.C., Musante, V., Horiuchi, A., Matsuzaki, H., Harrison, A., Brody, H., Wu, T., Greengard, P., Taylor, J.R. and Nairn, A.C. (2017) ARPP-16 is a striatal-enriched inhibitor of protein phosphatase 2A regulated by microtubule-associated serine/threonine kinase 3 (Mast 3 kinase). J. Neurosci. 37(10): 2709-2722 (PMCID: PMC5354324, PMID: 28167675).

Cao M, Wu Y, Ashrafi G, McCartney AJ, Wheeler H, Bushong EA, Boassa D, Ellisman MH, Ryan TA, and De Camilli P. (2017) Parkinson Sac Domain Mutation in Synaptojanin 1 Impairs Clathrin Uncoating at Synapses and Triggers Dystrophic Changes in Dopaminergic Axons. Neuron 93: 882-896 (PMCID: PMC5340420, available on 2018-02-22; PMID: 28231468).

Carlyle, B., Kitchen, R., Kanyo J., Voss, E., Pletikos, M., Lam, T. T., Gerstein, M., Sestan, N., Nairn, A.C. (2017) A Multiregional Proteomic Survey of the Postnatal Human Brain, Nature Neuroscience, in press.

Gorenberg, E., and Chandra, S.S. (2017). The Role of Co-Chaperones in Synaptic Proteostasis and Neurodegenerative Disease. Frontiers in Neuroscience (Roodveldt, C., Outeiro, T. F., Braun, J.E.A., Eds.) 11: 248 (PMCID: PMC5437171, PMID: 28579939).

Lees JA, Messa M, Sun WE, Wheeler H, Torta F, Wenk MR, De Camilli P, and Reinisch, KM. 2017. Lipid transport by TMEM24 at ER-PM contacts regulates pulsatile insulin secretion. Science 355: 6326 (PMCID: PMC5414417, PMID: 28209843).

Miller, M.B., Yan, Y., Machida, K., Kiraly, D.D., Levy, A.D., Wu, Y.I., Lam, T.T., Abbott, T., Koleske, A.J., Eipper, B.A., Mains, R.E. (2017) Brain Region and Isoform-Specific Phosphorylation Alters Kalirin SH2 Domain Interaction Sites and Calpain Sensitivity, ACS Chemical Neuroscience 8: 1554-1569 (PMCID: PMC5517348, PMID: 28418645).

Milovanovic, D. and De Camilli, P. (2017) Synaptic vesicles clusters at synapses: a distinct liquid phase? Neuron 93(5): 995-1002 (PMCID: PMC5347463, available on 2018-03-08; PMID: 28279363).

Musante, V., Li L., Kanyo, J., Lam, T.T., Colangelo, C.M., Cheng, S.K., Brody, H., Greengard, P., Le Novère N., Nairn, A.C. (2017) Reciprocal regulation of ARPP-16 by PKA and MAST3 kinases provides a cAMP-regulated switch in protein phosphatase 2A inhibition. eLife 2017 June 14;6. pii: e24998 (PMCID:PMC5515580, PMID:28613156, acknowledges/associated with DA018343)

Saheki, Y. and De Camilli, P. (2017) The extended–synaptotagmins. Biochim. Biophys. Acta 1864(9): 1490-1493 (PMCID in progress, PMID: 28363589).

Table 3: Yale/NIDA Neuroproteomics Center Cores

Core	Name	Role	Email
Administrative	Angus Nairn	Co-Director/PI	angus.nairn@yale.edu
	Kenneth Williams	Co-Director/PI	kenneth.williams@yale.edu
Discovery Proteomics	TuKiet Lam	Core Director and Protein Identification and Profiling	tukiet.lam@yale.edu
	Pietro DeCamilli	Phosphoinositide Analysis	pietro.decamilli@yale.edu
	Ewa Folta-Stogniew	Biophysics	ewa.folta-stogniew@yale.edu
Targeted Proteomics	Kenneth Williams	Core Director	kenneth.williams@yale.edu
Bioinformatics and Biostatistics Core (BBC)	Angus Nairn	Core Director	angus.nairn@yale.edu
	Robert Bjornson	High Performance Computing	robert.bjornson@yale.edu
	Kei-Hoi Cheung	Yale Protein Expression Database (YPED)	kei.cheung@yale.edu
	Mark Gerstein	Bioinformatics	mark.gerstein@yale.edu
	Hongyu Zhao	Biostatistics	hongyu.zhao@yale.edu
Pilot Research Projects	Marina Picciotto	Core Director	marina.picciotto@yale.edu