There are many career paths available for PhDs outside of the normal academic track. In this issue, we interview Esteven Santana, PhD, who is in his first year as a Science and Technology Policy Fellow at the California State Assembly. Dr. Santana graduated from The Ohio State University (OSU) in 2014 with a PhD in Biomedical Sciences. He performed his dissertation work in the laboratory of Dr. Robert S. Munson Jr where he focused on investigating how small RNAs affect iron homeostasis in nontypeable Haemophilus influenzae. Dr. Santana is currently working in the office of Assemblywoman Susan A. Bonilla.

1. How did you come to choose this non-traditional career path?
During graduate school I realized that scientists are not only needed to conduct discovery-based research in the laboratory, but are also needed in many other fields. The lack of scientific discussion in politics really drove me to want to contribute my knowledge and skills to communicating the importance of science directly to policymakers. I chose policy because of a love for politics in general. Working on “science policy” in a think tank environment is also extremely important, but I wanted to work in the legislature where I would be able to talk directly to elected officials about issues.

2. What did you do to prepare for your current position?
It started with mentoring/tutoring activities. I was a tutor and counselor for the Upward Bound program at OSU and I volunteered for a science outreach program. My only real “political experience” came by doing student government. This experience was my first and only exposure to looking at problems/issues, coming up with solutions and then voting on those solutions as a group. It was a good, but not perfect, primer on how government organizations function.

3. Did your PhD training prepare you for your current position? Are there any aspects of the job you felt completely unprepared for?
Very few graduate programs offer any type of training like this; however, the training we receive as graduate students to think critically, evaluate evidence, and draw sound conclusions based upon that evidence are skills that are helpful in any setting, not just in research or policy. The thing I felt most unprepared for was the complete lack of knowledge about how a legislature works but that only comes with real-life experience.

4. What are some things that you feel researchers should know about the legislative process?
A lot of things happen on the state level. Too often people focus on national politics, but the truth is DC is in gridlock. Pay attention to what your state is doing because those are the laws that will be affecting you. On a more general note, legislators really do care about their constituents. Politicians get a bad reputation of being beholden to special interest groups, but I assure you if enough constituents voiced their opinion loud enough and in strong enough force, no amount of money in the world would make an elected official vote against their constituents. Organize and talk to your representatives on the local, state, and federal levels because your voice matters.

5. Where do you see your career going from here?
I hope to continue to work in the legislature for a few years or work as a lobbyist gaining more skills on how to effectively work in a political environment. Eventually I want to work in DC as a lobbyist for scientific societies, research universities, or the biomedical industry. Whatever my path, I want to eventually bring my experience and skills to lobby on behalf of science in some capacity at the federal level.

Interested in science policy? Mount Sinai has its very own Science Policy group. Contact Ryan if you’re interested in joining (ryan.cummings@mssm.edu) and check out these websites: National Science Policy Group (http://natscipolgroup.org/) and We Will Not Give Up (www.wewillnotgiveup.org), with which the Mount Sinai Policy Group currently has several projects underway. Also, keep an eye out for emails on the Postdoc Listserve for upcoming seminars at Mount Sinai by NYS Senators and Congress(wo)men!
Hello it's me, Depression, talking
By Olivia Engmann

You may have started reading this article because you are looking for new facts on depression. The new fact is that you can use the writing itself as a clue towards the depressive state of the author. Linguistic studies on depressed cohorts have shown that not only the content of patients’ narratives is altered, but that they choose different semantics as well. For instance in poems, people with suicidal thoughts used more first-person attributes – one possible explanation is that as depressive poets are more reclusive, they may have more solitary experiences to write about than poets who interact with many people. A counter argument for this hypothesis is that there is also a significantly higher use of sexually-related words in the work of suicidal poets. Independently, the increased use of “I” (first person) was confirmed in depressive college students. Notably, students in recovery from depression masked the “I”-word in the beginning of their essays but the use increased towards the end.

In bipolar disorder and schizophrenia, which have until recently been inaccessible to diagnosis via language, patterns of speech vary when dreams are narrated. Compared to healthy subjects, bipolar patients jumped around when describing the sequence of reported dream events and kept deviating from the topic, while Schizophrenics used fewer words in general to describe events.

Besides being a diagnostic tool, our understanding of distinct speech patterns in psychosis and depression may also open new doors in literature. There is scientific evidence that the coincidence of bipolar disorder in literary cohorts is increased. Bipolar depression may contribute favorably to the writing process or enrich the works that are created.

David Foster Wallace, a writer who suffered from depression and hanged himself at age 46 in 2008, made brilliant use of language patterns while painting the image of a patient in his short story “The depressed person”:

“The depressed person said that she was all too horribly aware of what a joyless burden she was to her friends, and during the long-distance calls she always made it a point to express the enormous gratitude she felt at having a friend she could call and share with and get nurturing and support from, however briefly, before the demands of that friend’s full, joyful, active life took understandable precedence and required her (i.e., the friend) to get off the telephone.”

It has been Wallace’s goal to write so that the reader feels “less alone”. It would be fascinating if more writers were not only to write down the stories of their depressed or psychotic protagonists but would also make use of their linguistic patterns to add an additional level of identity.

Co-Chair Corner

Dear fellow postdocs,
Hope you had a lovely July 4th holiday and are enjoying the summer!

Your Postdoc Executive Committee (PEC) is hard at work organizing the 6th Annual Postdoc Symposium. It is on September 18th this year and the theme is “Education and Outreach”. See the “Save the Date” announcement on page 4 in this issue of the periodical and look out for more details in the months to follow. The whole day is packed with great programs tailored for postdocs, so make sure you mark your calendars to enjoy and participate in all of it.

Have you told us about your postdoc experience at Mount Sinai? If not, the Annual Postdoc Survey (https://www.surveymonkey.com/r/LMGRS82) is still open and your input is key to helping the PEC improve the postdoc training experience. You can also scan the QR code with your phone (see above) to access the website quickly.

Ryan J. Cummings and Merina Varghese are your PEC co-chairs

Welcome new postdoc periodiclal editors!

Olivia Engmann, PhD completed her PhD at King’s College London and then her first postdoc at INSERMu839 in Paris, France. Currently, she is a second year postdoc in the Department of Neuroscience in the Nestler lab.

Andrew Koemeter-Cox, PhD completed his PhD at The Ohio State University in the fall of 2014. Since then, he has been working in Dr. Jenny Zou’s lab in the Department of Neuroscience where he is studying epigenetic factors that can promote axon regeneration.

Laura Lecce, PhD received her PhD at the University of Sydney in reproductive biology. She did her first postdoc in cardiovascular research at the Heart Research Institute, Sydney and is currently a second year postdoc in Cardiology in the Kovacic Lab.

Salvador Sierra MD, PhD obtained his degrees from the University of Navarre, Pamplona, Spain. Six months ago he joined the Lakshmi Devi lab in the Department of Pharmacology and System Therapeutics where he is working on the interaction of cannabinoid and delta opioid receptors in a murine model of neuropathic pain.

The Mount Sinai Postdoc Periodical

Editors: Delaine Ceholski, Katie Nolan, Przemek Gorski, Alaa Abidine, Octavia Bane, Mar Gacias-Monsserrat, Natasha Eliyahu-Shtraizent, Olivia Engmann, Andrew Koemeter-Cox, Laura Lecce, Chiara Mariotti, Ileanyi Obiorah, Salvador Sierra

Ways to keep in touch

- Our website: http://icahn.mssm.edu/education/post-doctoral-training
- Follow our new Twitter account: @MtSinaiPostdocs
- Join our Facebook page: “Mount Sinai Postdocs”
- Follow us on LinkedIn (Mount Sinai Postdocs and Postdoc Alumni)
Proximity Ligation Assays, a new tool to show protein-protein interactions

By Salvador Sierra

Demonstrating protein-protein interactions is critical for understanding vital processes in life science. Leading experts in the field have proposed a set of criteria to be fulfilled in order to prove protein-protein interactions in endogenous tissue. Of these, colocalization in the same cellular and subcellular compartment is the most relevant. To date, immunofluorescence is the most widely used technique; however, the resolution is low which is why many reviewers request complementary techniques such as coimmunoprecipitation (co-IP). Still, co-IP shows the presence of both proteins in the same protein complex but not a physical interaction. In recent years, proximity based techniques such as BRET or proximity ligation assay (PLA) are becoming increasingly popular and are close to the resolution of electron microscopy (gold standard for colocalization). However, PLA overcomes many of the drawbacks of electron microscopy, as it has a faster turnaround time, less user experience required, and ability to be used both in vitro and ex vivo (in both naïve or modified specimens).

So what exactly is PLA? It is an antibody-based technique so specific antibodies against the two proteins of interest are required. Both antibodies can be raised in the same (direct PLA) or different (indirect PLA) species. In indirect PLA, species-specific secondary antibodies tagged with a DNA strand (PLA probes) are used; in direct PLA, PLA probes are attached directly to the primary antibodies. When the proteins of interest are in close proximity (less than 17 nm) PLA probes will join by enzymatic ligation to create a DNA template. This template will serve a polymerase to amplify the sequence and fluorescently labeled complementary oligonucleotides will highlight the product. The resulting fluorescence is easily visible as a distinct bright dot in the fluorescence microscope (see figure).

The same disadvantages we face with antibody-based techniques apply for PLA. It is therefore crucial to use appropriate antibodies and positive and negative controls (in both heterologous cells and tissue). A modification of this technique, called “PLA single recognition”, may be used to increase the signal-to-noise ratio in order to improve the specificity of the antibody to detect one protein.

Figure. Red dots represent each protein-protein colocalization, DAPI stain represents the nuclei.

Please feel free to contact me for further details: salvador.sierra@mssm.edu

The Immortal Jellyfish

By Laura Lecce

The 20th century has brought with it a dramatic increase in life expectancy and a heavy impact of aging and age-related diseases on our society. Due to an ever increasing aging population, the focus of research in understanding the biological mechanisms of healthy aging has intensified. One particular laboratory in Japan run by Prof. Kubota is utilizing a unique and extraordinary animal to understand the process of reverse aging and rejuvenation. The immortal jellyfish (Turritopsis dohrnii) discovered in 1988 in Italy is famous for its ability to repeatedly reverse its life cycle. A paper published in 1996 titled “Reversing the life cycle” described this ability as “a transformation potential unparalleled in the animal kingdom”. More recently, a New York Times article questioned whether understanding the rejuvenation potential of this jellyfish will lead to unlocking the secrets of immortality. Notoriously difficult to cultivate, Prof. Kubota’s laboratory in Japan has the only successful colony of this jellyfish in captivity. For over two years he has observed more than 9 rejuvenations of adult jellyfish to polyps and back to adulthood (click here for manuscript) thus escaping death and achieving immortality. This rejuvenation can be initiated by environmental stress or physical assault, but also occurs when the jellyfish becomes old or sick. This reverse aging occurs through a process termed transdifferentiation, when one type of mature cell is converted into another without dedifferentiation to a stem or progenitor cell and re-differentiation into a mature adult cell. Prof. Kubota has been quoted as saying “once we determine how the jellyfish rejuvenates itself, we should achieve very great things. My opinion is that we will evolve and become immortal ourselves.” So it seems that the reverse aging dreamed up in ‘The Curious Case of Benjamin Button’ may not be so curious in the future.

UPCOMING EVENTS

- The Postdoc Writing Group meets the 3rd Friday of the month at noon in Hess Center room 10-122 (10th floor). The next meetings are July 17 and August 21. If you have writing to work on, let us know and bring a few copies of it (1-2 page piece, ideally an abstract or introduction and no results or methods sections). The group will also read CVs and cover letters. Follow the ISMMS PostdocWriting group on twitter @PostdocWriting. To join the mailing list visit: http://mailman.mssm.edu/mailman/listinfo/postdoc-writing

- The writing seminar series happens every 2nd Monday of the month from 4-5pm. Come and improve your writing skills! When and where: August 10 at 4 pm in the Annenberg building room 25-51 (25th floor). Food will be served. Please RSVP to astrid.stoker@mssm.edu
SAVE THE DATE
Friday, September 18th, 2015

ISMMS 6th Annual Postdoc Symposium
~ Education and Outreach ~

with keynote address by
Dr. Gregory Petsko
Weill Cornell Medical College

Venue

Career panels
Data Blitz
Networking
and more!