The ORT Times

A monthly newsletter featuring UHN Trainees

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Editorial

Writing for the Masses: The Fine Art of Science Journalism

By MW Freeman, ORT Science Writer and UHN Research Trainee

You've done your research, corresponded with experts, and written what you consider a thorough and thought-provoking article for a popular publication. Soon, the article is splashed onto your publisher's website and across the pages of the print edition. Now, you wait.

A few hours later, you find yourself in crisis. The comments are legion and… they aren't good. They're scathing, in fact. With horror, you find that this savage criticism was carefully authored by experts in the field you focused your article on, all of whom live and breathe this subject matter.

"Same But Different" by Siddhartha Mukherjee in *The New Yorker*. *Image courtesy of* MW Freeman http://www.mwfreemancreative.com

Nightmare.

Siddhartha Mukherjee, a physician, cancer researcher, and author of the Pulitzer Prize-winning novel, *The Emperor of All Maladies*, recently found himself in a similar, terrible situation.

Continued on next page

June 2016

Inside this issue

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EDITORIAL

Continued from previous page

In the hours and days following the publication of his May 2, 2016 article, "Same But Different," in *The New Yorker*—an artful exploration of epigenetics—Mukherjee experienced tremendous backlash from the scientific community, particularly those privy to current research in the nuanced epigenetics field. His central error: oversimplification. The debacle makes clear the fine line separating academic rigour and reader accessibility; the line science journalists must walk daily.

Moving Parts

"Epigenetics is complex stuff, and Mukherjee simplified it to the point of error," writes Aleszu Bajak, a senior writer at *Undark*. The mutable and fast-moving science of epigenetics looks closely at the control *nurture* (our environment) can have over *nature* (our genes), and how these effects might be passed through generations. Mukherjee wove an unarguably gorgeous tapestry as a backdrop for his explanation, describing the divergent geographical, temperamental, and physical paths his mother and aunt—identical twins—took from their tandem birth. Where he erred, experts say, was in his description of epigenetics' moving parts. Rather than highlighting transcription factors as central characters in the drama of gene regulation (the prevailing theory), the doctor focused most of his 6,000 words on the regulating action of DNA methylation and histone modification (largely unproven mechanisms). This discrepancy drew the rancor of epigenetics researchers worldwide, many indicating that Mukherjee's writing would never have passed scientific peer review.

But, where is the line? When should popular science writing simplify complex scientific issues, and when should it not? How do writers face the difficulties associated with translating and scrutinizing science for the general public?

The Balance

During a visit to Boston, several outstanding science journalists were charitable enough to share with me their approaches to managing the weighty task of writing science for the masses.

Aleszu Bajak in Cambridge, MA.
Image courtesy of MW Freeman http://www.mwfreemancreative.com

"I don't want scientists to contact me about misrepresenting their work," says Lisa Grossman, physical sciences news editor at *New Scientist*, "[but] there is a balance between packing every detail into a story and deleting the narrative." Similarly, discussing the aim for each of his articles, *Undark*'s Bajak says, "First, I want to avoid being wrong, [but I also] want readers to read the whole piece and enjoy it."

Writing science for popular publications, one might be competing for the attention of audiences who picked up a paper for the latest on the Kardashians or to glance at a concept vehicle of apparent Martian origin. These journalists bear the responsibility of penning an entertaining and approachable read for lay audiences while simultaneously honouring the complexity of the science at hand.

Hype, Hysteria

Elie Dolgin, a Canadian-born science journalist and a former editor at *STAT*, warns that bad science writing can be especially damaging in the realm of public health. "Here, you have to be careful to get it right…there are lives at stake." Media coverage of misrepresented or overstated health claims can come at the risk of inciting "hype and hysteria," Dolgin says, citing skewed science reporting as the germ of present-day anti-vaccination trends.

Elie Dolgin in Boston, MA.
Image courtesy of MW Freeman http://www.mwfreemancreative.com

Continued on next page

EDITORIAL

Continued from previous page

To defend against slanted coverage of important issues, Joshua Sokol, a freelance science journalist in Boston, says, "It is important to foster a healthy skepticism of your own mastery." When trying to make sense of new science, Sokol encourages writers to always have an expert by their side. "Remember, there is a difference between being an expert and being a journalist."

A Critical Eye

Phil McKenna, an energy and environment reporter at *InsideClimate News*, told me that rather than acting as a simple communicator of research findings, his job is to provide a critical analysis of what is being studied and of concurrent media coverage. "The best case scenario for a science piece is one where it changes the debate through narrative and investigation. That is high impact." The well-informed conversations science journalists can ignite—by mouth, by retweet, by comment, or otherwise—may be some of the greatest value these writers add.

Phil McKenna in Cambridge, MA.
Image courtesy of MW Freeman http://www.mwfreemancreative.com

At present, we are able to consume and readily interact with an incredible volume of science media. "Now is a great time to be a reader of science," says Thomas Levenson, professor of science writing at MIT. With each article aimed at "moving people into [a realm of] understanding," a rich diet of science media affords readers (and writers) an ever-refreshing perspective of themselves and of the world.

One Story at a Time

In his response to the "Same But Different" fiasco, Bajak wrote, "…it's worth asking if [explaining epigenetics from scratch] can be done at all, by anyone, in a popular magazine—the goal of which, in any case, is not to mimic a scientific journal, but to communicate to the general public the alluring frontiers of science."

In a note to *Vox*'s Brian Resnick, Mukherjee points out that his original article was nearly twice the length of the final, with a "lengthy historical section mentioning gene regulation." The author certainly is not oblivious to the mechanisms of gene expression and regulation; Mukherjee's newest book, *The Gene: An Intimate History*, dives deep into these matters. Clearly, the choices made in editing this work, optimizing it for the reader, were difficult ones. As journalists, Resnick writes, "We can only tell one story at a time."

Mind the Gap

Though readers of science are in good hands with today's formidable cohort of science journalists, what can scientists do to narrow the gap between the elegant storytelling of popular magazines and the relative impenetrability of scientific journal data? Perhaps the answer lies in the assumptions one makes about their audience, and the warm-and-cozy feeling this audience is presumed to have for jargon and acronym cascades.

Perhaps, if researchers worked to express their findings using similar powers of rhetoric to writers of *The New Yorker*, their papers might be better enjoyed by reviewers, and, maybe, accepted more readily.

Perhaps, if emphasis were placed on reader engagement and accessibility, scientific journals could become viable sources of information for members of the interested lay public, thereby expanding readership and resources in concert.

Perhaps, the research scientist's focus on language as a tool for inclusion could spur revolution in the public understanding of science.

A level playing field, where creativity reigns and science is truly for the masses.

Utilizing the Circadian Rhythm to Maximize Health

By Michael Chang, ORT Writer and UHN Trainee

The human body is incredibly efficient at adapting to constantly changing environments. Humans have muscles that will grow and strengthen when exercised, a metabolism that will slow down and speed up according to food availability, and most importantly a circadian rhythm that anticipates and prepares for changes in the external environment (Garaulet et al. 2010).

Image courtesy of http://www.istockphoto.com/

Understanding Our Circadian Rhythm

The rhythm, also known more commonly as the "biological clock", is composed of many complex dynamical systems (i.e. protein and mRNA transcript levels from different organs) that oscillate in a coordinated manner to make internal changes (metabolically, neurophysiologically, etc.) at specific times of the day that prepare us for expected external events (Garaulet et al. 2010). This ability is essential for the body to respond and function appropriately. Consequently, disturbing the oscillating system's rhythm can disrupt the entire circadian rhythm, an effect that is known as chronodisruption (Erren and Reiter 2009).

The Circadian Rhythm and Weight Gain

Certain aspects of the circadian rhythm regulate how we metabolize our meals. For instance food-anticipatory activity (FAA) is a circadian behaviour that causes us to increase our physical activity when we anticipate food. It maximizes the release of metabolism hormones (ghrelin, insulin, etc.) that are essential for proper digestion and efficient absorption of food. If we eat at the wrong times or eat when FAA is not active, our body is not prepared to metabolize food correctly and will likely store it as visceral fat, in our stomach and around our organs.

A number of habits can throw your circadian rhythm off balance. For instance viewing bright electronic screens at night can cause our brain to perceive it is daytime. Consequently, when our brain sends the incorrect signal to the rest of our organs and peripheral tissues, it forces their respective rhythm to change as well (see figure). The various rhythms in our body do not change at the same rate and can take up to seven days to re-synchronize. This means for an entire week our body is sub-optimal and unprepared to perform correct functions when required, such as the ability to metabolize food eaten at lunchtime because our body thinks it is still sleeping. This is the physiological basis behind being "jet-lagged".

Other societal habits can disrupt our circadian rhythm including having high energy intake from a single meal, alternating meal times, and frequent snacking throughout the day. Normally, the fluctuation of stomach-derived hormones such as leptin and ghrelin (that regulate food intake) are governed by the circadian rhythm. However, persistent irregular eating patterns can cause large unpredictable fluctuations in these hormones that will eventually de-synchronize it from the main circadian rhythm. Potential implications are poor regulation of food intake that may encourage weight gain.

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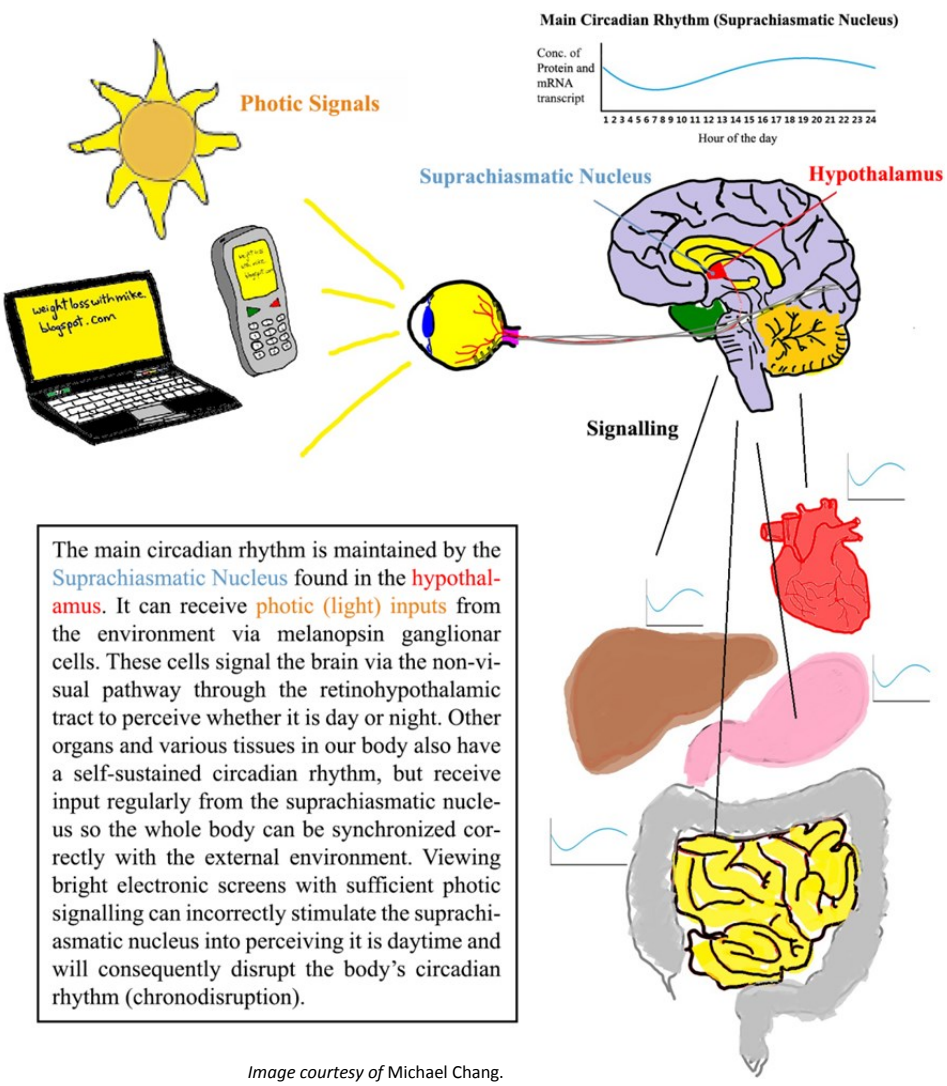
Maintaining Your Rhythm

You can maintain an in-sync circadian rhythm by having regular timed exposures to Zeitgeber stimuli. This can be achieved by following a scheduled lifestyle that involves regular sleep-wake times, meal times, and exercise (the three main Zeitgeber stimuli) to help entrain the circadian rhythm. Here are some central steps to follow:

1. Maintain regular sleep-wake cycles
2. Sleep for ~8 hours
3. Eat at regular meal times
4. Exercise regularly (preferably before your largest meal of the day
5. Maximize your exposure to sunlight during the day

Have regular meal times. For individuals who tend to have unpredictable sleep schedules, simply having regular meal times can help maintain the correct rhythm for metabolic reactions. Researchers found that animals with surgically removed suprachiasmatic nuclei were still able to maintain their metabolic rhythm by eating their meals at regular times. This indicates that the rhythm for metabolism can be entrained by restricted feeding times, independently from the suprachiasmatic nucleus's rhythm (the main biological clock). So even though you can't maintain a regular sleep/wake cycle, it is important to eat meals at the same time each day (give or take 30 minutes) to ensure food is metabolized correctly and not deposited as visceral fat.



The main circadian rhythm is maintained by the Suprachiasmatic Nucleus found in the hypothalamus. It can receive photic (light) inputs from the environment via melanopsin ganglionar cells. These cells signal the brain via the non-visual pathway through the retinohypothalamic tract to perceive whether it is day or night. Other organs and various tissues in our body also have a self-sustained circadian rhythm, but receive input regularly from the suprachiasmatic nucleus so the whole body can be synchronized correctly with the external environment. Viewing bright electronic screens with sufficient photic signalling can incorrectly stimulate the suprachiasmatic nucleus into perceiving it is daytime and will consequently disrupt the body's circadian rhythm (chronodisruption).

Image courtesy of Michael Chang.

Exercise at the same time each day to further entrain your body's circadian rhythm. The best time to exercise is right before you eat because over time this scheduling will entrain your body's circadian rhythm (and perhaps through classical conditioning as well) to anticipate food after every workout. This is beneficial as research suggests the body is most effective at protein uptake right after a workout (Weinert 2009).

In summary, we can maximize the body's efficiency to metabolize food and prevent fat accumulation by entraining the body's circadian rhythm to become perfectly synchronized with the predictable external environment.

References:

Erren TC, Reiter RJ. 2009. Defining chronodisruption. *Journal of Pineal Research* 46:245-247.

Garaulet M, Ordovas JM, Madrid JA. 2010. The chronobiology, etiology and pathophysiology of obesity. *International Journal of Obesity* 34:1667-1683.

Weinert DJ. 2009. Nutrition and muscle protein synthesis: a descriptive review. *The Journal of the Canadian Chiropractic Association* 53:186.

After breast cancer, the arm still remembers

Boquiren VM, Hack TF, Thomas RL, Towers A, Kwan WB, Tilley A, Quinlan E, Miedema B. A longitudinal analysis of chronic arm morbidity following breast cancer surgery. Breast Cancer Res Treat. 2016 May 18. [Epub ahead of print]

By Shaalee Dworski, ORT Writer and UHN Trainee

Breast cancer affects the lives of patients in a variety of ways emotionally, physically, and interpersonally. Survivors of breast cancer may feel triumphant, but their struggle is not over; both physical and mental shrapnel remains.

The development of arm and shoulder difficulties post-treatment frequently elicits considerable disruptions in many areas of life functioning. The arm on the affected side may feel painful, change in volume, and decrease in functionality after cancer treatment. This can negatively affect quality of life by reducing what activities survivors feel they can do with their arm, which may lead to symptoms of depression and anxiety.

Dr. Virginia Boquiren, currently a post-doctoral fellow in Dr. Mary Jane Esplen's laboratory, worked with Dr. Thomas Hack and colleagues to study the prevalence of arm morbidity in Canadian breast cancer survivors. The condition of the cancer survivors was monitored yearly for 5 years following their diagnosis.

The authors found that arm morbidity, negative affect, and perceived disability with respect to the affected arm's functionality were greatest in the first year after surgery and significantly declined in the years following treatment. The association between the emotional negative effects and arm pain remained, even as physical arm pain lessened each year. This may be because although the pain lessened it was still sufficiently high to continue to exert an adverse impact on survivors' mood.

This study highlights one of the ongoing struggles that breast cancer survivors face.

Click here to access the full manuscript.

The ORT caught up with Dr. Virginia Boquiren:

ORT: How can doctors prepare breast cancer patients for arm morbidity?

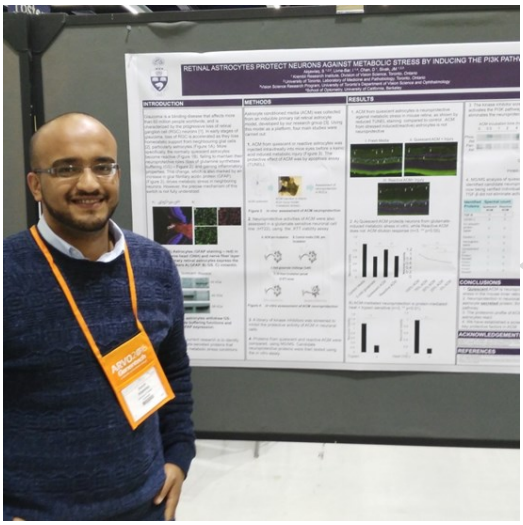
Providing information to breast cancer survivors on the potential development of arm morbidity following treatment may better prepare them to cope with this side-effect.

ORT: Can exercise act as an intervention for arm morbidity?

Yes. Applying a comprehensive rehabilitative model would help the timely implementation of interventions designed to address the broad range of functional limitations associated with breast cancer treatments.

Dr. Virginia Boquiren, first author and Princess Margaret Cancer Centre Postdoctoral Fellow

CONFERENCE REPORTS



Trainee: Samih Alqawlaq, PhD Candidate

Supervisor: Dr. Jeremy Sivak, Krembil

Abstract: Retinal astrocytes protect neurons from metabolic stress through the PI3K pathway

Conference: The Association for Research in Vision and Ophthalmology (ARVO), May 1–5, 2016, Seattle, WA, USA

Click here to read Samih's conference report!

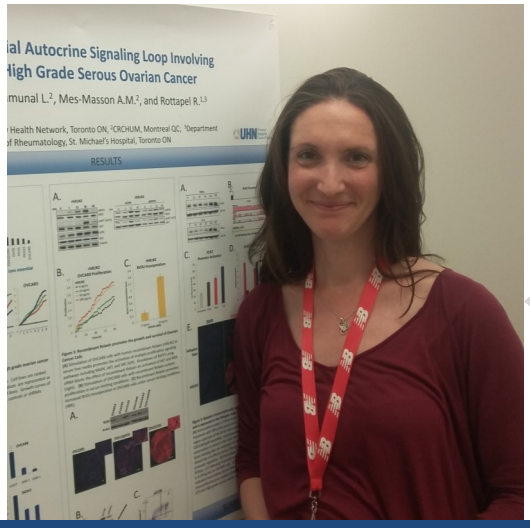
Trainee: Agata Bartczak, Postdoctoral Fellow

Supervisor: Drs. Armand Keating and Ian McGilvray, Krembil

Abstract: Towards the repair of marginal liver grafts: ex vivo mesenchymal stromal cell perfusion

Conference: Immunology 2016, May 13-17, 2016, Seattle, WA, USA

Click here to read Agata's conference report!



Trainee: Helen Burston, Postdoctoral Fellow

Supervisor: Dr. Robert Rottapel, PM

Abstract: Identification of an essential autocrine signaling loop involving relaxin and RXFP1 in high grade serous ovarian cancer

Conference: Terry Fox Research Institute Annual Meeting, May 12-13, 2016, Vancouver, BC, Canada

Click here to read Helen's conference report!

CONFERENCE REPORTS

Trainee: Allan Martin, PhD Candidate

Supervisor: Dr. Michael Fehlings, Krembil

Abstract: 1) A prospective longitudinal study in degenerative cervical myelopathy using quantitative microstructural MRI with tract-specific metrics
2) Translating state-of-the-art spinal cord MRI techniques to clinical use: a systematic review of clinical studies utilizing DTI, MT, MWF, MRS, and fMRI

Conference: International Society for Magnetic Resonance in Medicine (ISMRM), May 10-14, 2016, Singapore

Click here to read Allan's conference report!

Trainee: Yekaterina Poloz, Postdoctoral Fellow

Supervisor: Dr. Vuk Stambolic, PM

Abstract: Insulin receptor signaling contributes to mammary tumorigenesis in mice

Conference: AACR Annual Meeting, April 16-21, 2016, New Orleans, LA, USA

Click here to read Yekaterina's conference report!

UPCOMING EVENTS & FUNDING CALENDAR:

15/07 **STARS21**

The program provides clinicians, graduate students and post-doctoral fellows with the skills essential to conducting innovative research in radiation medicine. Click here for details.

01/08 **Science & SciLifeLab Prize for Young Scientists**

The Prize is awarded annually to one young scientist (who has been awarded a doctoral degree in the past two years) for outstanding life science research. Click here for details.

11/08 **Postdoctoral Fellowship**

The Human Frontier Science Program postdoctoral fellowships encourage early career scientists to broaden their research skills by moving into new areas of study while working in a new country. Click here for details.

12/08 **Postdoctoral Fellowship**

The European Molecular Biology Organisation (EMBO) offers two year fellowships with a focus on international exchange. As such, movement between countries is a prerequisite of this biannual fellowship. Click here for details.

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Smoke Free Ontario Act Enforcement

The University Health network is committed to providing a healthy and safe environment for all employees, patients and visitors. As a result, UHN is committed to becoming a smoke-free environment.

On January 1, 2016, new Ontario regulations (Smoke-Free Ontario Act and the Electronic Cigarettes Act) were established. As of July 1, 2016, designated smoking areas will no longer be available on UHN property and smoking will be prohibited on all UHN property.

Those who do not comply with the rules will be fined. For individuals, a first time offense results in a maximum fine of $1000 or $5000 for subsequent offences. For institutions, a first time offense results in a fine of $100 000 or $500 000 for subsequent offences.

For questions or information on smoking cessation, please visit http://www.uhn.ca/corporate/AboutUHN/smoking_Cessation/.

"Piled Higher and Deeper" by Jorge Cham www.phdcomics.com

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