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THE PARTNER



In this student edition of The Partner we feature two emerging biomedical researchers...

Yasnee Beeharry, a Graducate student from the University of Ottawa, discusses her work on Hepatitis Delta Virus and what her research will mean for Canadians.

Sarthak Sinha, volunteer with the MS Ambassador program, and a grade ten student at Henry Wisewood High School in Calgary, discusses his work with the Biernaskie laboratory and his hopes for the direction of MS research.

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IN THIS ISSUE

Page 1 - A message from the Executive Director

Page 2 - Hepatitis Delta Virus: A Fascinating virus

Page 3 - Reversing MS using STEM cells from the skin

Page 4 - VROC programming update

A message from the Executive Director...



Partners In Research has good news. We have decided to enlarge the focus of our annual awards Gala. This year we will host one awards event that will be national in scope and recognize leading researchers that mobilize research in biomedical sciences, Science, Technology, Engineering and Math (STEM).

This inaugural event--now called the Partners In Research National Awards--will be hosted on June 2, 2013 at the Lamplighter Inn in London Ontario. Proceeds from the evening awards ceremony will continue to be used to encourage Canadian youth to pursue careers in these disciplines through the Virtual Researcher On Call program.

Please save the date: June 2nd 2013. We hope that you and your friends, colleagues, students and others in the community will join us in celebrating Canadian accomplishments in research and scientific outreach and inspiring the next generation of youth in these fields.

I would also like to thank contributors to The Partner from the last twenty five years. The January 2013 edition will be the last in its current form. Partners In Research will be modifying our quarterly newsletter by posting guest articles to our blog rather than creating a periodical. Partners In Research will still be pleased to accept submissions that, in plain language, celebrate the advances in health research.

Kevin Cougler, *Executive Director*

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Hepatitis Delta Virus: A fascinating virus



By Yasnee Beeharry, Graduate Student from the University of Ottawa.

I have always been fascinated by viruses, these organisms that are at the borderline of the definition of life. Their status in the life tree is controversial since they have to rely on their hosts to reproduce. Indeed, the definition of a living organism implies that it has the ability to reproduce without the aid of another species, while the virus requires a host to reproduce. Viruses are thought to be relics of Ancient World, at the time of the apparition of the first form of life. Their study may help in the understanding of the origin of life. Viruses are the source of devastating diseases. They are always evolving and adapting with the human immune system. Therefore, it is crucial to better understand virus replication to be able to counteract them and to develop new therapeutics.

Currently, I am doing my PhD in the laboratory of Dr. M. Pelchat, at the University of Ottawa, working on the Hepatitis Delta Virus (HDV), the smallest human virus known. Its genetic makeup allows the synthesis of only two proteins. By contrast the AIDS virus genome allows the synthesis of 9 different proteins, the flu virus 11 proteins while human genome can produce 20000 proteins. Despite its small size, this pathogen is responsible of the most fulminant form of hepatitis. It is fascinating how this virus, in appearance simple, heavily hijacks its host's proteins and takes advantage of host cellular pathways to ensure its own replication. Unlike other viruses that use viral proteins for their own reproduction, HDV hijacks the human protein, "RNA Polymerase II" (RNAP II), a fundamental protein involved in the synthesis of components within the cell. RNAP II acts by "reading" the information encoded in the human DNA. However, in the case of HDV, the RNAP II is used to read a genetic material of a different nature. My project is to study HDV reproduction and to determine how HDV is diverting the RNAP II in this unconventional way. I also work on the identification of other human proteins that are hijacked in HDV reproduction.

My results will help to better understand this unconventional use of the RNAP II in human cells. The study of the other proteins involved in the HDV replication will help to learn more about their normal function in the human cell. In addition, this work will help elaborating a therapeutic strategy against HDV. This is an urgent need, since there is currently no specific treatment for HDV. Worldwide, it is estimated that more than 20 million people are infected with HDV. According to WHO, the mortality rate for patients with an HDV infection is up to 20%. The severe form of the disease causes liver failure and liver transplantation remains the only therapy. Moreover, this knowledge can more generally be used also for the development of therapeutic strategies for similar viruses.

Introducing: Sarthak Sinha, MS Ambassador... *See his article on reversing MS using stem cells on the next page*



My name is Sarthak Sinha and I'm a high school researcher working on the possibility of harvesting skin stem cells as an autologous source of treatment. During the two years spent working with the brightest minds in Canada, one of the biggest things I've realized is that there's no power strong enough which can hold back curiosity and learning at any age! I joined the Virtual Researcher On Call program with a vision to spark the drive to learn at an early age which I hope will lead to a greater interest in basic science and biomedical research.

L'Inversion de la SP en utilisant des cellules souches cutanées

This editorial was originally written by Sarthak Sinha, volunteer with the MS Ambassador program, and a grade ten student at Henry Wisewood High School in Calgary for MS Society. It was republished with the permission of Sarthak Sinha.

This would be my second year working for Biernaskie laboratory, a renowned name with the interest of stem cell biology and clinical neurosciences. If there is one thing I have learned through my stay at the lab is optimism and hope. An optimistic approach to neuroscience research and treatment. By recently joining the MS Ambassador program, I really hope I'm able to spread my vision and dreams among the MS community.

Degenerative diseases, such as MS, have posed a challenge in the frontiers of neuroscience for decades. With some of the best brains working towards chasing a cure and superior therapeutic measures to treat MS, it's been an honour to be part of the front lines of research aimed at uncovering the potential of skin stem cells for their usage in degenerative diseases of the Central Nervous System (CNS).

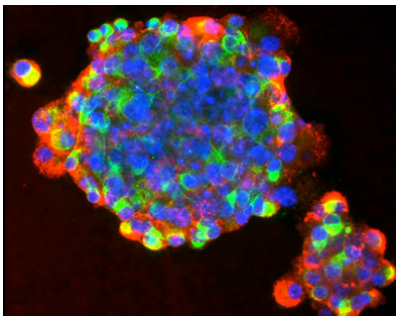
Following the discovery of dermal stem cells, Dr. Jeff Biernaskie, my current mentor, was able to take cells from human dermis and enrich them to make Schwann cells, a principal glial cells of Peripheral Nervous System (PNS). With these Schwann cells derived from skin, there is hope that these cells can myelinate MS lesions and potentially achieve functional recovery.

My studies revolve around understanding Schwann cells derived from the skin and how we can use them towards clinical transplantations. One of my upcoming projects would be to study whether skin stem cells can serve as a potential towards treatment of MS.

Since our lab is affiliated with the Hotchkiss Brain Institute, a national leader for neuroscience research, it's exciting to hear about these discoveries in this field on a daily basis. One of the highlights for this year was a 3.8 million dollar grant, by Multiple Sclerosis Society of Canada, for researchers to study progressive forms of MS. Many world class researchers, including Dr. Wee Yong, are working on grants ranging up to 5 million dollars to understand this disease.

One of my most remembered quotes from Dr. Yong is, "Twelve years ago, we had no medications to treat MS itself. Today we have four disease modifying therapies in use with better medications and therapies undergoing clinical trial. In fact, over 150 clinical trials related to all types of MS are currently underway worldwide... Imagine what we will be able to offer people with MS 12 years from now".

With so much to achieve in this field, it's important that we, the MS community, are able to achieve a long term and sustainable vision. In order for us to be treating MS efficiently within the upcoming decade, it's crucial to train young minds and motivate them towards careers as clinicians or researchers to continue our work in MS. This would be my primary focus during my stay with the MS Society as I would like to spark interest in my peers towards following a career dedicated to medicine and neurosciences. For me personally, I would like to pursue neurosurgery and clinical research so I can continue striving towards a world where MS would a be long forgotten history.



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VROC Programming Update

Partners In Research (PIR) and the Alberta Distance Learning Centre (ADLC) have joined forces to bring Virtual Researcher On Call (VROC) programming to Alberta.

Starting in February, teachers across Alberta will be able to bring Science, Technology, Engineering and Math (STEM) experts -- from post-secondary institutions, governments, industry and non-profit organizations -- into their classrooms via video conference.

VROC in Alberta (VROC Alberta) gives teachers access to a large database of STEM experts that are categorized by subject matter and name. Teachers can read descriptions on the expert's area of expertise and affiliation and with one click can bring them into their classrooms for spontaneous, real-time learning opportunities based on student inquiry.

VROC and ADLC were excited with the uptake at the pilot stage of VROC Alberta and look forward to rolling out full programing in February 2013. For more information visit **www.vroc.ca/Alberta**.

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