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“The Biobank: A true gem!”

- Julie Carrier, PhD

Researcher and professor in the Department
of Psychology at the Université de Montréal



In this issue:

- > **Ophthalmology:** Advanced equipment
- > **Mental health:** Geriatric psychiatry
- > **Planned giving:** Life insurance policies



“The Canadian Sleep Research Biobank: A true gem”

– Julie Carrier, PhD, Researcher and Scientific Director of the Biobank

Imagine large freezers filled with **40,000 blood, urine and spinal fluid samples**. Add to that an entire computer infrastructure containing clinical data collected from these same patients who have given their consent to have their samples stored. This is the Canadian Sleep Research Biobank. This jewel is carefully kept at the Centre for Advanced Research in Sleep Medicine (CARSM) at Sacré-Cœur. Julie Carrier, researcher and professor in the Department of Psychology at the Université de Montréal, is the scientific director of this Biobank. We met with her in an interview to talk about this great initiative that began more than a decade ago.

What is?



The **cerebrospinal fluid** is the fluid of the central nervous system, located in the meninges and in the central cavities of the brain.

Q: Are there other sleep biobanks in the world?

A: There are sleep biobanks elsewhere in the world, but we are the first to organize a national biobank that includes the participation of several Canadian sleep centres. Samples are received from across Canada. In order for them to be used for research purposes, the procedures for consenting to their use and how the samples are collected, processed and stored had to be developed and standardized.

Q: How long has it been in place and who came up with the idea?

A: It was Dr. Jacques-Yves Montplaisir who was among the first researchers in the world to look at the genetics of certain sleep disorders, such as restless leg movement disorder and sleepwalking. The Biobank began very locally, using Excel files. I became the scientific director of the CARSM in 2010 and I could see that Jacques had accumulated a lot of samples. I said to myself that we could no longer continue to operate in a haphazard way and that we needed to have a genetic force to structure ourselves. We hired Simon Warby. He, along with the Canadian Sleep and Circadian Network, standardized and created the Canadian Sleep Biobank we know today.

Q: What types of samples are in the Biobank now?

A: We have collected biological samples from patients with sleep apnea syndrome, REM sleep behaviour disorder, insomnia and sleepwalking. We also have samples from patients with medical conditions that are associated with major sleep difficulties, such as head trauma, Parkinson's disease and mild cognitive impairment.

Q: What is the purpose of a biobank?

A: The first thing a biobank allows us to do is to understand sleep diseases and how genes are associated with the development of certain diseases. That's how we can eventually develop therapies. Another thing is to try to be able to predict the development of severe consequences linked to certain sleep diseases. If I take, for example, sleep apnea syndrome (when you stop breathing while you sleep), if it is not treated there are two types of very serious impacts: at the cardiovascular level and at the level of neurodegeneration. It is estimated that about 80% of people are not diagnosed because the waiting lists are long and the resources are not there. A group of researchers are currently using the Biobank to study the markers (measurable biological characteristics) that will predict that someone will develop serious cardiovascular consequences as a result of

What is?

The **Polysonnography** is the best test to study sleep disorders. Using sensors applied to different areas of your body, polysonnography allows us to study the physical manifestations during your sleep by recording numerous signals of electrical activity of your brain, your heart and your respiratory efforts. It also records the level of oxygen saturation in your blood and other parameters that help differentiate your sleep cycles and stages. Finally, it detects, quantifies and qualifies the presence of abnormalities such as:

- > sleep apnea (breathing problems)
- > periodic leg movements
- > Bruxism (grinding and clenching of teeth)
- > REM sleep behaviour disorder (physical behaviours related to dreams)
- > Narcolepsy (sleepiness and sleep attacks during the day)

sleep apnea. If we can find these markers, your doctor will be able to take a blood sample and say, I think you have sleep apnea and this marker is high. They might prioritize you and say you need to be seen sooner.

Q: What are the biggest challenges brought on by this Biobank?

A: Just managing the freezers to keep the samples at -80 degrees Celsius, that's quite a challenge. There are alarms in case of breakage. The contents of a freezer must never thaw without being noticed. Thousands of samples could be lost. The freezers are in two separate locations and half of a sample is in one freezer and half in the other, so that if anything happens, we don't lose all of the samples. This is very valuable. The transport of the samples is also done very carefully. Recently, 1,500 samples were shipped to three major centres in the United States. The samples are sent frozen on dry ice, via FEDEX. Someone is in charge of the shipment and there is someone at the destination point waiting for the precious package. The package is constantly tracked. In the same way, we receive a lot of samples, it can't stay in the handling office all weekend. There's a whole team of people who take care of these logistics. It's a small industry in itself. We have a very busy staff. There are about 10 people working for the Biobank, including two programmers and two medical laboratory technologists, and they work very hard.

Q: What future do you see for the Biobank?

A: There are about 15 laboratories that contribute to this Biobank, but it's going to be exponential. The more we talk about it, the more we give conferences and the more researchers want to embark on this adventure. Because there are questions that can only be answered by joining our efforts. The next step is to bring the Biobank to its cruising speed, which will allow young researchers to benefit from these efforts made over the last 10 years. Our next dream is to be able to add a Canadian database with all the sleep patterns associated with these biological samples. For the moment, the data is still in each of the centres, someone can request samples from x number of patients, but we still have to contact centres to have access to the information. My hope is that we do the same standardization as we did for the biological samples with polysomnography. The day we do that, we will be the world leaders.

Q: What exactly is the Foundation's financial support used for?

A: Over the past 10 years, we have developed the Biobank's expertise, infrastructure and reputation. The collection of new samples and the requests for analysis of the Biobank data are constantly increasing. The Foundation's \$225,000 contribution for the next 12 months gives us leverage to allow us to build on our achievements and move on to a new phase of development that will stimulate discoveries on sleep disorders.

DISTINCTION

Canadian Sleep Society



Société Canadienne du Sommeil

A great honour for Julie Carrier!

At the opening of its 10th national conference, the Canadian Sleep Society presented the 2021 Distinguished Scientist Award to Julie Carrier.

Eager to play a key role in the transfer and mobilization of knowledge resulting from her research, Julie Carrier has given more than 40 lectures to the general population and to specialized audiences. Since its launch in 2019, she has also been the scientific director of the bilingual Canadian awareness campaign *Dormez là-dessus!/Sleep On It!* which aims to promote the importance of sleep in maintaining good health and to raise awareness of sleep disorders.

Her work links the quality of sleep of people in their fifties to their risk of developing Alzheimer's disease in later life. As scientific director of the Canadian Sleep and Circadian Network, she has also studied the developmental aspects of sleep in children, the role of sleep in cognition and brain sensitivity to light.

Recognized as a leader in her field, she was elected a Fellow of the Canadian Academy of Health Sciences in 2017. The Distinguished Scientist Award recognizes researchers who have made significant contributions to sleep research in Canada.

Source: Université de Montréal /News



Research results thanks to the Biobank

Research centres participating in this Biobank and other partners can access samples and data, which facilitates research. However, not everyone gets these samples. Interested researchers must submit their project and all required documents to the Biobank management committee, on which the Biobank's scientific director, Julie Carrier, sits. They must hold an ethics certificate and demonstrate that they have the resources to analyze and care for the samples. Some samples have been sent to Europe, but with the agreement of the Biobank's contributing researchers who have the final say. "In 2015, we were at the beginning of open science, but some researchers were still a little reluctant to share their data that they took time to collect. That's why we decided to do this by giving them a say in how the samples are used," said Julie Carrier.

Here are some of the research results that are providing more and more clues about certain diseases attributed to lack of or poor sleep.

Neurodegenerative diseases

REM sleep behaviour disorder is a disorder that alters the brain mechanism that prevents us from moving during REM sleep, the stage of sleep associated with dreams. This disorder makes movement and behaviour possible. The patient can laugh, walk, grab, hit, stand up and even get up while sleeping. The team of Dr. Jacques-Yves Montplaisir, Dr. Ronald Postuma and Dr. Jean-François Gagnon has shown that REM sleep behavioural disorder is a precursor to certain neurodegenerative diseases such as Parkinson's disease. The teams of Dr. Montplaisir, Dr. Alex Desautels and Dr. Guy Rouleau have also identified several genes associated with REM sleep behaviour disorder.

Restless legs syndrome

Restless legs syndrome is a neurological disorder in which patients have unpleasant sensations in their legs causing an irrepressible urge to move them. It frequently interferes with sleep and can cause insomnia. The teams of Dr. Montplaisir, Dr. Desautels and Dr. Rouleau have identified genes associated with restless legs syndrome.

Chronic insomnia

Several studies are trying to determine whether certain genes are associated with chronic insomnia. While some studies suggested that the MEIS1 gene was associated with chronic insomnia and restless legs syndrome, the results of Simon Warby and his collaborators showed that the MEIS1 gene was only associated with restless legs syndrome, but not with chronic insomnia. These results show the importance of distinguishing between chronic insomnia and restless legs syndrome for genetic studies.

Sleepwalking

While it is known that sleepwalking occurs during the deep sleep period, the teams of Dr. Montplaisir and Dr. Desautels also found that it is partly determined by genetics. However, the genes associated with sleepwalking have not been identified. The adenosine deaminase (ADA) gene is an interesting candidate since it is associated with the regulation of deep sleep. However, the work of Dr. Desautels' team recently showed that this gene was not associated with sleepwalking.

All these research results allow us to have more and more clues about certain diseases attributed to lack of sleep or poor sleep.

They're talking about our sleep experts!



**Dr. Jacques-Yves Montplaisir,
Officer of the Order of Canada**

Without a doubt one of the fathers of sleep medicine, Dr. Montplaisir received a prestigious distinction on December 29: he was named Officer of the Order of Canada. This honour was awarded to him for his pioneering and influential research in the development and advancement of sleep medicine, which has led to improved health for Canadians. Among his major accomplishments, Dr. Montplaisir founded the first Canadian Sleep Research Centre in 1977 at the Montreal Sacré-Cœur Hospital. For over 45 years, he has contributed his expertise and knowledge to Sacré-Cœur, making great achievements over the years.

Three of our researchers participate in a television series

Three researchers from the Montreal Sacré-Cœur Hospital Research Centre, Julie Carrier, Valérie Mongrain and Véronique Pepin, have been invited to participate in a series to be broadcast on November 24, 2021, on Savoir Médias entitled *En quête de sommeil*. Hosted by popular science writer Jean-Daniel Doucet, this series answers the big questions about sleep. In six 30-minute episodes, the series looks at the basics of sleep, restorative sleep, sleep and emotions, sleep and medication, dreams and nightmares, and the different types of sleep. Available online on the savoir.media website.

Purchase of advanced equipment to treat retinal diseases

For the past few months, the Ophthalmology Department of the Montreal Sacré-Cœur Hospital has been using the latest generation of Zeiss imaging platform. The Foundation invested \$116,000, out of a total acquisition cost of some \$300,000, to provide this department with state-of-the-art equipment. The Government of Quebec provided the balance of the required funding. In addition to providing more accurate treatment of retinal diseases, this imaging platform will allow the department to attract a specialist in the field who will complete their training in the United States before joining the Sacré-Cœur team. According to Department Head Dr. Ali Hafez, without this technology, it would not have been possible to recruit a resource of this calibre.

Staff have been trained to use the two devices included in the platform. The first is a CLARUS 700 camera that was designed for eye care specialists to capture ultra-widefield, true-color images of the back of the eye with unsurpassed image quality and to perform retinal angiography. The other is a Cirrus7000 OCT machine with OCT angio to perform more advanced ocular imaging. It is possible to follow up on glaucoma and various pathologies and to detect damage before a patient is even aware of a deterioration of his condition.

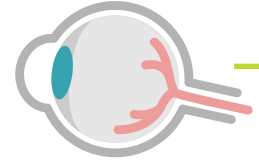
What is?



The **Optical Coherence Tomography (OCT)** is a modern ocular imaging procedure that provides non-invasive cross-sectional images of the eye in seconds, with the possibility of reconstruction.



What is?



The **retinal angiography** is an examination that is used to evaluate the condition of the vessels of the retina, a membrane that covers a large part of the back of the eye. During this exam, images are taken of the back of your eyes.



According to nurse clinician Valérie Rivet from Sacré-Cœur's outpatient ENT-ophthalmology clinic, it is possible to perform up to 30 examinations of this type in a day, whereas before, about four examinations were performed and not even every day. As for the CLARUS camera, it is used occasionally because there is a space issue for its use on a daily basis, which will be resolved with the relocation of certain activities to the new Integrated Trauma Centre. With this camera, it is possible to better document lesions on the retina, for example.

"This system optimization makes a big difference, both in the quality of care we provide, but also in the amount of testing our staff is able to do. The tests are technically easier to perform. The wide-angle camera does not require hiring a medical photographer and patients do not need to have their pupils dilated," said Dr. Hafez, who is very pleased with the purchase for Sacré-Cœur, one of the few facilities in the Greater Montreal area to have such equipment.

For Valérie Rivet, these devices will be of great use to the seven ENT doctors, seven ophthalmology doctors and six nurses who are attached to the clinic, when they are used to their full potential.

Geriatric psychiatry: A major specialty at Albert-Prévost!



What is?

Geriatric psychiatrists are psychiatrists who treat illnesses such as depression, bipolar disorder, psychotic disorders, personality disorders and anxiety disorders, taking into account the particularities related to the elderly and aging (cognitive disorders, medical co-morbidities and polypharmacy) and the particularities related to their social life (retirement, bereavement, relocation).

At the Albert-Prévost Mental Health Hospital, the geriatric psychiatry service has a team of five geriatric psychiatrists, nurses, a social worker, a neuropsychologist, specialized educators and occupational therapists who follow up on elderly patients with psychiatric or psychological problems. The geriatric psychiatrists also train colleagues and participate in research projects to meet the hospital's academic mission. This team works in collaboration with the teams at the Montreal Sacré-Cœur Hospital in particular to help to adapt care to aging. The role of a geriatric psychiatrist can change depending on the environment. In outlying regions, for example, the geriatric psychiatrist does less case management and acts more as a consultant to his or her psychiatric colleagues, family physicians and geriatricians.

The geriatric psychiatry team at Albert-Prévost has 16 inpatient beds located at Jean-Talon Hospital and collaborates with CHSLDs and intermediate resources to provide outpatient care. "There are limited resources for the elderly and this is an age group that is increasing. We can't be all small teams. There is a lack of resources like everywhere else, but in my team, we are very united and tightly knit. It's really interdisciplinary work that is the essence of who we are, our success and our strength," said Dr. Shamlan, geriatric psychiatrist at Albert-Prévost.





Dr. Nathalie Shamlan
Geriatric psychiatrist



Dr. Sarah Brunelle
Geriatric psychiatrist

Seeing things from a different perspective

"We live in an aging society. You can look at it as something heavy, something dramatic, or you can look at it, on the contrary, as something that is filled with positivity," shared Dr. Shamlan.

She praised the resilience of older people, especially since the pandemic began, knowing that they were asked to stay locked in rooms or apartments for months at a time under the guise of protection. "The pandemic has taught us that sometimes we can overdo it. That protection can become unhealthy and create a lot of isolation." Dr. Nathalie Shamlan is happy to see that some seniors have spoken out to preserve and defend their freedom. She hopes that they will have prevented such excesses in the future and that this education will benefit future generations.

Putting seniors back in the picture

Dr. Shamlan says this period has taught us that older people are an asset and have much to contribute. It's a good time, with an aging population, to start looking at aging more constructively. "The problem is that our society was and still is very focused on youth and efficiency. With the lockdowns, we've seen that everyone is important and that people as they age have qualities that are sometimes unique to older people."

Studies show that older people are happier on average than younger people. They've developed more wisdom and self-regulatory abilities in general. "The pandemic also showed us how vulnerable, but also necessary, older people can be. How many families were disorganized by not being able to rely on grandparents to watch children who couldn't go to daycare. They didn't want to expose the grandparents to COVID," said Dr. Sarah Brunelle.

Dr. Shamlan says there is a need to focus on seniors. They have multiple challenges and sometimes mental health problems that need to be diagnosed and treated. There is a need to develop expertise and know-how in geriatric psychiatry. We need to get some of that back.

That's precisely what Dr. Shamlan and Dr. Brunelle want us to start doing by taking an interest in these generations who can teach us a lot and who are paving the way to tame our own old age. Something to think about!

A life insurance policy could facilitate a substantial gift!

Do you have a life insurance policy? It could allow you to make a significant gesture towards the Foundation without being complicated or having to pay more!

Many people decide to take out a life insurance policy to protect their loved ones when they start their career and family. Years later, when your career is well established, you are retired or the children are on their own, you may feel that the policy is less relevant.

However, this policy (especially if it is fully paid up) retains all its value and could even allow you to leave a significant donation to one or more charities, without this being difficult to do.

It is indeed possible to contact the insurer who issued the policy (or your successor) and ask them to add among the names of the beneficiaries of the policy the name of, for example, our foundation (Montréal Sacré-Cœur Hospital Foundation). You will then have a simple form to fill out and that's it! At the time of your death, the Foundation will inherit the percentage you have indicated in its favour on your life insurance policy.

Another option would be to add the Foundation as a contingent beneficiary. In this case, if the primary beneficiary(ies) of the policy has died or waived the policy, the contingent beneficiary, the Foundation, will receive the full amount of the insurance upon your death.

There are other ways to use a life insurance policy to make a gift, but this is the easiest. You can have a discussion about that with your financial advisor.

If you would like more information or have any questions, please contact me. I will be happy to answer them. Take the time to think about it until we can talk in person!



M^e Marie-Claude Tellier

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Thank you to all our big hearts!

Good news! Over 175 donors have newly joined our monthly giving program implemented in 2021. You are one of nearly 500 donors who are part of this beautiful **Circle of Big Hearts** donors who make a monthly gift.

In light of the success of this program, our generous partner, Mr. Pierre Karl Péladeau, who has committed to double the total amount of all new commitments made to the **Circle of Big Hearts** program, up to a maximum of \$15,000, has decided to donate an additional \$10,000. Thank you so much for this \$25,000 contribution!

Thanks to these monthly commitments, the Foundation has more than \$160,000 per year at its disposal to better fulfill its role: supporting modernization projects, financing the work of researchers, equipping physicians and health professionals to adequately prepare the next generation of physicians and purchasing state-of-the-art equipment. All of this has one main objective: to improve care.

If you would like to be part of our **Circle of Big Hearts**, you can do so at any time online on our website (by choosing the I choose monthly donation option) or by calling the Foundation.



Pierre Karl Péladeau



Your donations make great things happen, like the new Integrated Trauma Centre.

Thanks

Thank you for transforming lives with us.

Pénélope McQuade
Volunteer spokesperson

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Founded in 1976 by the Sisters of Providence, the Montréal Sacré-Cœur Hospital Foundation has as its raison d'être to help the extended Sacré-Cœur and Albert-Prévost team constantly improve the care, treatment and environment of patients, while supporting the research and teaching activity of this university hospital.