



# Happy Holidays



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## Happy Holidays and Happy New Year 2021!

In 2021, CARTaGENE will begin its 12th year of activity!

We would not have been able to take this important step without the involvement of participants helping to generate new data and the contribution of researchers using this data to advance health research.

The CARTaGENE team wishes you a wonderful holiday season and a happy new year 2021. May this new year be synonymous with discoveries and successes for all health research projects!

## Genotyping the entire cohort!

Last year we announced that the entire CARTaGENE cohort (N = 30,000) would be genotyped. We are aware of the interest this data has to the scientific community. Many of you have contributed to the content added to the Global

Screening Array (GSA) chip.

Unfortunately the circumstances surrounding the pandemic delayed the genotyping project. The data will, however, be available in early 2021. For researchers who already have an ongoing project with CARTaGENE and have an SDAC approval for access to genetic data, it will be possible to obtain the data through an accelerated process. We will be sending an email as soon as the data is available. If you are interested in genotyping data, please write to us at [access@cartagene.qc.ca](mailto:access@cartagene.qc.ca).

## Whole Genome Sequencing of 2,000 participants

The GenoRef-Q project led by two Scientific Directors of CARTaGENE (Guillaume Lettre, Ph. D. and Simon Gravel, Ph. D) is moving forward! A \$ 3M grant from Génome Québec in partnership with Genome Canada will allow the sequencing of the genome of more than 2,000 participants of the CARTaGENE population cohort, selected among the 30,000 already genotyped.

More details here:

[http://www.genomequebec.com/DATA/COMMUNIQUE/359\\_en.pdf](http://www.genomequebec.com/DATA/COMMUNIQUE/359_en.pdf)

## CARTaGENE & COVID-19

This year 2020 was noticeably marked by the pandemic linked to SARS-CoV-2, where CARTaGENE has been able to take part in the research on COVID-19 with its participation in CanPath's pan-Canadian project. As part of this project, more than 33,000 participants of the cohort were contacted again during the summer of 2020 to answer a questionnaire related to COVID-19.

Nearly 8,000 participants responded and the data collected will be made available to researchers. The pre-existing structure of the CARTaGENE population cohort has demonstrated its role in public health surveillance during this pandemic by collecting and analyzing, within a very short time period, useful results for public health. The main results are as follows:

- It appears that there was a lack of accessibility to testing for people with symptoms compatible with COVID-19 during the first wave;
- The four main symptoms selected by the MSSS seem to be adequate enough as an indication to perform a screening test;
- Access to healthcare was severely disrupted during confinement but remote consultations had offset this effect and a particular effort by the health system was made in the recent months;
- The socio-economic and psychological impacts seem moderate for the moment but should be monitored in the coming months and reassessed after the second wave.

## COVID-19 : seroprevalence within the cohort

Thanks to its presence within the Canadian consortium, CARTaGENE is proceeding with the second part of its study on COVID-19. This is a national study on the seroprevalence of antibodies specific to COVID-19 in the more vulnerable populations. This study is being carried out thanks to two major sources of funding: Canada's COVID-19 Immunity Task Force and the Canadian Institutes of Health Research (CIHR), which have invested \$1.9 million and \$2.1 million respectively.

This pan-Canadian study will collect blood samples from participants in each cohort, with the aim of detecting the presence of SARS-CoV-2 antibodies, which is an indication of recent infection with the new coronavirus.

Within CARTaGENE, the collection of samples from participants will begin in 2021.

## 7 new projects in 2020

This year again, many projects have been approved by CARTaGENE's access committee:

### **Characterization of psychiatric polygenic determinants in Quebec**

Principal Investigator: Guy Rouleau, Université McGill

## **Lifestyle habits, plasma metabolites and cardiovascular health in a cohort of individuals with heterozygous familial hypercholesterolemia**

Principal Investigator: Jean-Philippe Drouin-Chartier, Université Laval

## **Susceptibility genes and molecular drivers of lung cancer**

Principal Investigator: Yohan Bossé, Université Laval

## **Investigating the role of non-coding variations in epilepsy**

Principal Investigator: Simon Girard, Université du Québec à Chicoutimi

## **Investigation of biomarkers of radiation exposure in radon cohorts**

Principal Investigator: Vinita Chauhan, Santé Canada

## **Genomics deep learning**

Principal Investigator: Ali Torkamani, The Scripps Research Institute

## **Using CARTaGENE data for the proof of concept research project of ARCHI (PRECINOMICS pilot): Study of genetic and clinical risk factors for cancer and cardiovascular disease**

Principal Investigator: Marie-Pierre Dubé, Institut de cardiologie de Montréal

To date, there are 62 current projects as well as 17 new amendments.

## **20 new publications**

Also, 20 new scientific publications include analyses based on CARTaGENE's data:

- N. Power, S.S. Deschênes, F. Ferri, N. Schmitz, [Job strain and the incidence of heart diseases: A prospective community study in Quebec, Canada, J Psychosom Res. 139:110268](#)
- A.T. Ali, Y. Idaghdour, A. Hodgkinson, [Analysis of mitochondrial m1A/G RNA modification reveals links to nuclear genetic variants and associated disease processes, Commun Biol. 3\(1\):147](#)
- L.C. Desbiens, R. Goupil, F. Madore, F. Mac-Way, [Incidence of fractures in middle-aged individuals with early chronic kidney disease: a population-based analysis of CARTaGENE, Nephrol Dial Transplant. gzf259](#)

- H.Y. Han, C. Paquet, L. Dubé, D.E. Nielsen, Diet Quality and Food Prices Modify Associations between Genetic Susceptibility to Obesity and Adiposity Outcomes, *Nutrients*. 12(11):E3349
- M. Khalili, F. Lepeyre, J. Guertin, R. Goupil, S. Troyanov, J. Bouchard, F. Madore, Impact of updated recommendations on acetylsalicylic acid use for primary prevention of cardiovascular disease in Canada: a population-based survey, *CMAJ Open*. 8(1): E41-E47
- L.C. Desbiens, A. Sidibé, C. Beaudoin, S. Jean, F. Mac-Way, Comparison of Fracture Prediction Tools in Individuals Without and With Early Chronic Kidney Disease: A Population-Based Analysis of CARTaGENE, *J Bone Miner Res*. 35(6):1048-1057
- S.S. Deschênes, R. J. Burns, N. Schmitz, Anxiety and Depression Symptom Comorbidity and the Risk of Heart Disease: A Prospective Community-Based Cohort Study, *Psychosom Med*. 82(3):296-304
- N. Zhao, A. Smargiassi, M. Hudson, M. J. Fritzler, S. Bernatsky, Investigating associations between anti-nuclear antibody positivity and combined long-term exposures to NO<sub>2</sub>, O<sub>3</sub>, and PM<sub>2.5</sub> using a Bayesian kernel machine regression approach, *Environ Int*. 136:105472
- S. Anand, M. Friedrich, D. Desai, K. Schulze, P. Awadalla, et al., Reduced Cognitive Assessment Scores Among Individuals With Magnetic Resonance Imaging–Detected Vascular Brain Injury, *Stroke*. 51(4):1158-1165
- Y. Payette, C.S. De Moura, C. Boileau, S. Bernatsky, N. Noisel, Is there an agreement between self-reported medical diagnosis in the CARTaGENE cohort and the Québec administrative health databases?, *IJPDS*. 5(1): 16
- M.E. Dupuis, A.C. Nadeau-Fredette, F. Madore, M. Agharazii, R. Goupil, Association of Glomerular Hyperfiltration and Cardiovascular Risk in Middle-Aged Healthy Individuals, *JAMA Netw Open*. 3(4): e202377
- S. Behl, N. Hamel, M. de Ladurantaye, S. Lepage, R. Lapointe, A.M. Mes-Masson, W.D. Foulkes, Founder BRCA1/BRCA2/PALB2 pathogenic variants in French-Canadian breast cancer cases and controls, *Sci Rep*. 10(1): 6491

- J. Duhazé, R. Jantzen, Y. Payette, T. De Malliard, C. Labbé, N. Noisel, P. Broët, Quantifying the Predictive Accuracy of a Polygenic Risk Score for Predicting Incident Cancer Cases : Application to the CARTaGENE Cohort, *Front Genet.* 11:408
- N. Power, S.S. Deschênes, F. Ferri, N. Schmitz, The Association Between Job Strain, Depressive Symptoms, and Cardiovascular Disease Risk: Results From a Cross-Sectional Population-Based Study in Québec, Canada, *Int Arch Occup Environ Health.*
- F. Ferri, S.S. Deschênes, N. Power, N. Schmitz, Association between depressive symptoms, metabolic risk factors, and cognitive function: cross-sectional results from a community study in Quebec, Canada, *Aging Ment Health.*
- N. Zhao, A. Smargiassi, M. Hatzopoulou, I. Colmegna, M. Hudson, M.J. Fritzler, P. Awadalla, S. Bernatsky, Long-term exposure to a mixture of industrial SO<sub>2</sub>, NO<sub>2</sub>, and PM<sub>2.5</sub> and anti-citrullinated protein antibody positivity, *Environ Health.* 19(1):86
- N. Zhao, A. Smargiassi, I. Colmegna, M. Hudson, M. Fritzler, S. Bernatsky, Sunlight exposure, sun-protective behaviour, and anti-citrullinated protein antibody positivity: A general population-based study in Quebec, Canada, *Arthritis Care Res.*
- F. Lamarche, M. Agharazii, F. Madore, R. Goupil, Prediction of Cardiovascular Events by Type I Central Systolic Blood Pressure, *Hypertension.*
- H. C. Gerstein, E. E. Smith, C. Ramasundarahettige, D. Desai, P. Awadalla, P. Broet, S. Black, T. J. B. Dummer, J. Hicks, A. Moody, J-C Tardif, K. K. Teo, J. Vena, S. Yusuf, D. S. Lee, M. G. Friedrich, S. S. Anand, Diabetes, Brain Infarcts, Cognition and Small Vessels in the Canadian Alliance for Healthy Hearts and Minds Study, *J Clin Endocrinol Metab.*
- R. E. Hall, N. Tusevlijak, C. F. Wu, Q. Ibrahim, K. Schulze, A. M. Khan, D. Desai, P. Awadalla, P. Broet, T. J. B. Dummer, J. Hicks, J-C Tardif, K. K. Teo, J. Vena, D. Lee, M. Friedrich, S. S. Anand, J.Tu, The Canadian Alliance for Healthy Hearts and Minds: How Well Does It Reflect the Canadian Population?, *CJC Open* 2(6):599-609

**CARTaGENE is proud of your scientific successes!**  
**Remember to inform the team when you plan to submit an article based on CARTaGENE data.**

Projects and publications using CARTaGENE's data pique your interest?

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