

# Indigenous Peoples and Genomics: Starting a Conversation

UBC Learning Circle: October 17, 2017



THE UNIVERSITY OF BRITISH COLUMBIA  
**Faculty of Medicine**



Acknowledge the traditional and ancestral territories of the  
Coast Salish First Nations

Musqueam, Tsleil-Waututh, and Squamish



# Team



**Co-leaders:** Patricia Birch & Jenny Morgan

**Co-I's:** Rachel Coe & Rochelle Lesueur

## **Collaborators:**

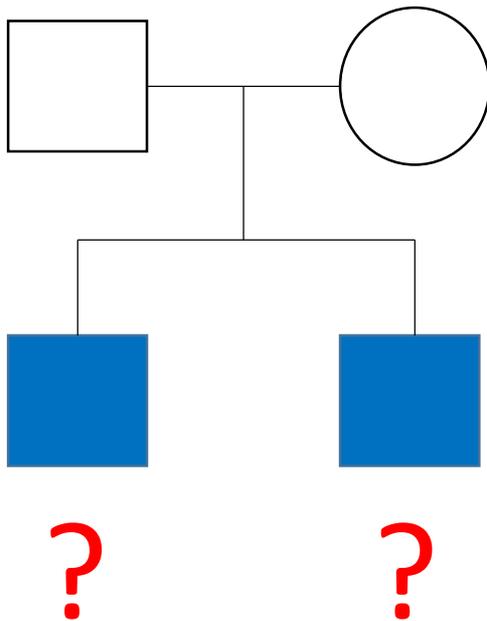
- \* Roberta Price, First Nations Elder (Snuneymuxw/Cowichan)
- \* Nancy Makela, focus group facilitator
- \* Bill McKellin, medical anthropologist
- \* Anna Lehman, medical geneticist
- \* Jan Friedman, medical geneticist
- \* Susan Law, touchpoint film expertise (McGill)

# Outline

- The impetus for the project: a First Nations family
- Introduction to genomic sequencing
- Limitations of sequencing
- Consequences for Indigenous Canadians
- Solutions? TRC and the history of genetics research
- Our project – starting a conversation
  - Community based participatory research
  - Respectful collaboration
  - Process and outcomes
- We welcome lots of questions and comments!

# Why this project?

## Family tree



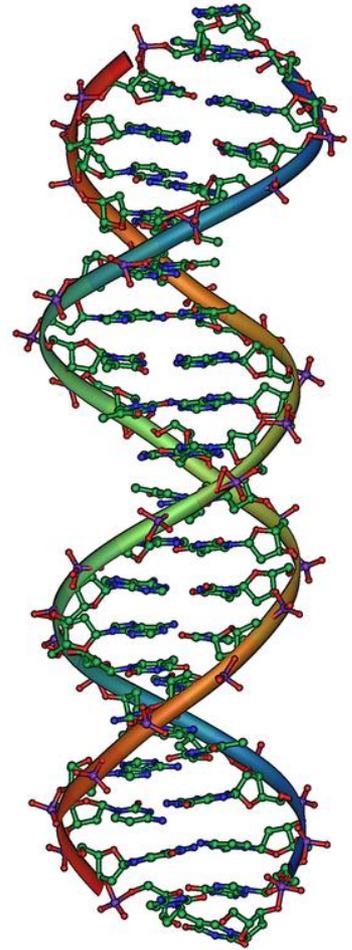
- Healthy parents and their two children who have some specific health problems
- Many tests were done – nothing explained their problems

# Genomic sequencing....

- A powerful new test
- Looks at all the genetic material (the genome) at once
- High diagnostic rate
- Can sometimes lead to changes in management
- Occasionally it can point to a treatment

# How does genomic sequencing work?

- Sequence ~ 3,000,000,000 DNA pairs that are our body's instructions for functioning
- In a genetic condition, as little as ONE change (“**variant**”) in one DNA letter can cause devastating problems
- We just need to find it!



**How do we find the problematic variant?**

# The human genome is very variable!

We are “only” 99.9% the same as each other.  
What is the remaining 0.1%?

( Answer: 3 million areas of difference that  
make us unique! )

Here is one variant:



**Me:** aatgcctatagggggcadaaaa**a**ccc

**You:** aatgcctatagggggcadaaaa**t**ccc

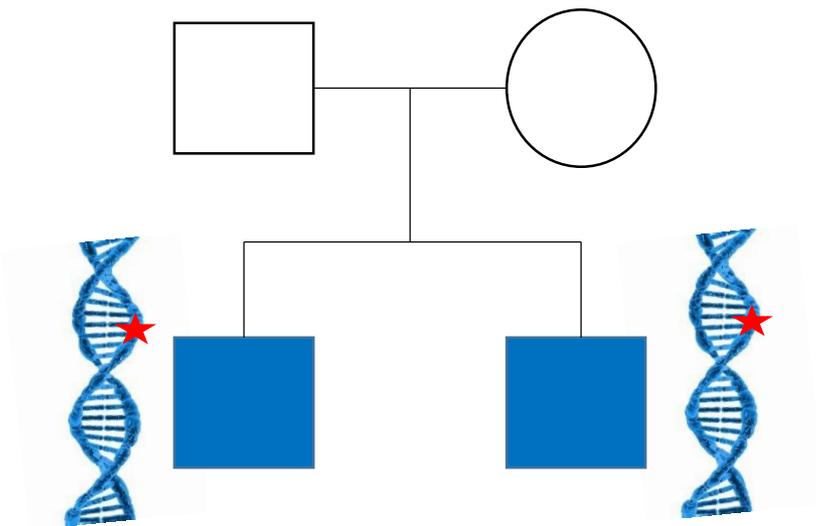
# There is no “perfect genome”!

There is no single “perfect string of DNA” that we can use as a reference.

We need to look at databases that contain DNA sequences from thousands of healthy people.

Compare all those millions of variants to check to see if they are present in the database.

# Genomic sequencing

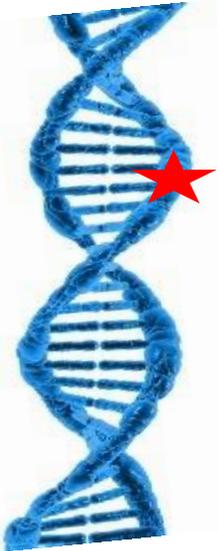


- Genomic sequencing examined all the DNA
- A change (“variant”) was found in both children
- It had never been seen before in healthy or sick kids
- Meaning??

# What is the meaning of this?

- (a) The variant may cause problems
- (b) It is a normal variant

But if it is a normal variant, why isn't it in the database?



# Think about your own family

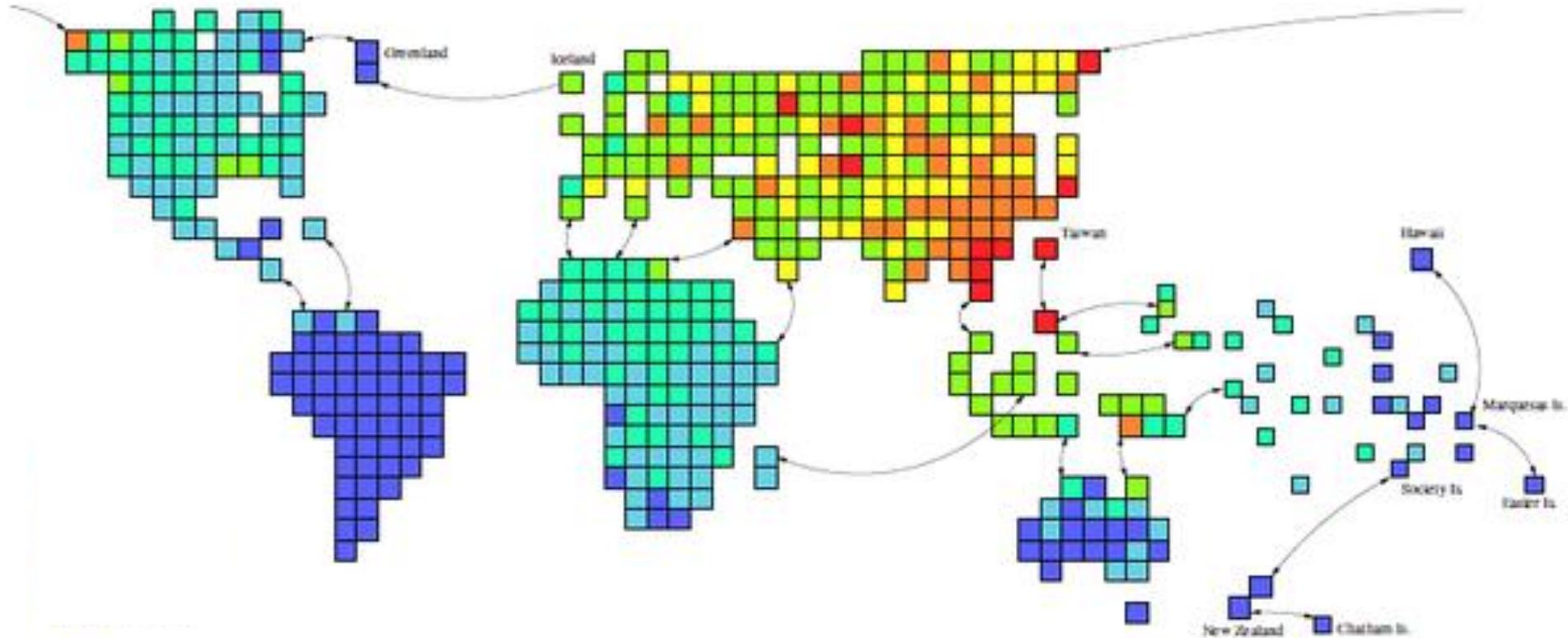
Why do siblings look alike?  
Why do you look like  
your dad?



Our DNA is most similar to our closest relatives' DNA

Our DNA is most different from people who originated from the other side of the world

# A visual depiction of genetic diversity



# gnomAD – an international database

- A resource developed by an international coalition of investigators
- *...for the benefit of the wider biomedical community, without restriction on use*

# gnomAD data

~150,000 anonymized genomic sequences

Contributed by many genomic projects throughout the world: USA, Finland, Quebec, Estonia, Bulgaria, England, Taiwan, Sweden, Germany....

What is missing?

<http://gnomad.broadinstitute.org/>

# gnomAD - 2017

Other ~2%



gnomAD

# Consequences in Canada

- The genomes of First Nations, Inuit, and Métis are virtually absent
- Significant challenges interpreting DNA variants
- Clinical genomic testing of Indigenous Canadians is compromised
- 5.8% of the Canadian population are Indigenous



# Purpose



To start a conversation with BC's  
Indigenous Peoples about genomic testing

Raise awareness and understanding of  
under-representation in genomic databases

The consequences for clinical genomics

# Technical solution...



Add Indigenous  
genomes to gnomAD

... but, at what cost?

... how do we ensure a  
process of transparency,  
reciprocity, trust, and  
approaches that are  
decolonizing?

*The word 'research', is probably one of the dirtiest words in the Indigenous world's vocabulary.*

Nowrouzi et al Global Journal of Health Science; 9(4) 20-30; 2017

*But the word "UBC genetics research" is worse.*

UBC researcher: Ryk Ward – mid 1980's

- 883 blood samples from Nuu-Chah-Nulth people for rheumatoid arthritis study. - No results returned
- Used for genetic anthropology and other studies, without consent, up to his death in 2003.
- Samples returned in 2004



*“Unfortunately, Ward taught us not to trust researchers just like the Residential School taught us not to trust the Church.”*

*“He used us like cheap guinea pigs, and that incenses me.”*

Larry Baird, Nuu-chah-nulth First Nation

In Canada, Larry Baird (quoted above) is the chair of the Nuuchah-Nulth ethics committee – resiliency of the Nation.

During the time of the transfer of the samples back to the tribe, the Nuuchah-Nulth also formed their own Research Ethics Committee to review all research protocols.

## PROTOCOLS & PRINCIPLES FOR CONDUCTING RESEARCH IN A NUUCHAH-NULTH CONTEXT

Nuuchah-Nulth Tribal Council  
Research Ethics Committee

August 2008

<http://www.cahr.uvic.ca/nearcbc/documents/2009/NTC-Protocols-and-Principles.pdf>



# Ha-Shilth-Sa

Canada's Oldest First Nations Newspaper - Serving Nuuchah-nulth-aht since 1974

Vol. 31 - No. 25 - December 16, 2004 *haasitsa* "Interesting News" Canadian Publications Mail Product Sales Agreement No. 4047776

## Nuuchah-nulth blood returns to west coast

By David Wiwchar  
Ha-Shilth-Sa Reporter

**Ahousaht -** After a 20-year journey halfway around the world, hundreds of vials of Nuuchah-nulth blood have returned home to the west coast. And although people welcome its return, many remain critical of the system that allowed its misuse in the first place.

**After a 20-year journey halfway around the world, hundreds of vials of Nuuchah-nulth blood have returned home to the west coast. And although many people welcome its return, many remain critical of the system that allowed its misuse in the first place.**

Dr. Richard (Ryk) Ward took 883 vials of blood between 1982 and 1985 under the guise of a \$330,000 Health Canada funded study of arthritis amongst Nuuchah-nulth, then the largest-ever genetic study of a First Nations population in Canada.

Since there are multiple forms of rheumatic disease in a high proportion of Nuuchah-nulth, particularly Ahousaht, Ward thought he could show a genetic predisposition and then began working towards a cure.

"We feel that if a proper study is carried out it will identify all people who have a problem with their joints, and a physiotherapy treatment can be started as a way of helping them," Ward wrote in a 1981 letter to the Nuuchah-nulth Tribal Council. "In order to carry

out the study, I would like to survey every person in Ahousaht so that we can be sure exactly who has a problem with rheumatic disease and who helps help."

According to Ward's final report, published in 1987, his team of researchers interviewed 1,878 (82%) of all 2,300 adult Nuuchah-nulth, in 13 different reserve communities and members living away from home in Port Alberni, Tofino, Nanaimo, and Victoria. Of those surveyed, 883 people (44.3%) were selected to give 30 ml of blood so research could begin on whether there was a genetically inherited aspect to rheumatic diseases.

"In Caucasian populations the overall prevalence is of the order of 1%," Ward described in his project overview. "The prevalence rates for rheumatoid arthritis in adult Native Indians are between 3% and 8%," he wrote.

But after he failed to find any genetic markers in the DNA, he shelved the study, and that's where things started to go wrong.

In 1986, Ward left his position as Associate Professor of Medical Genetics at the University of British Columbia. He accepted a position as Associate Professor of Human Genetics at the University of Utah, where the U.S. Department of Health offered a further \$172,000 to allow further study of the blood. Again, he found nothing. In 1996, he accepted a position as the head of the newly-formed Institute of Biological Anthropology at Oxford University in England, where he used the blood himself, and loaned it to other researchers for a variety of studies.

These Nuuchah-nulth blood samples were used to produce hundreds of



**In January of this year, nine boxes of documents, and hundreds of vials of Nuuchah-nulth blood serum arrived at the University of British Columbia. The blood was placed into a freezer at UBC, and the documents were taken to the BC Children's Hospital in Vancouver, where they sit in a corner of Department Head Rob McMaster's office.**



**"Our family has been hit pretty hard by arthritis," said Ahousaht Elder Cosmos Frank. "It's really, really hard to watch someone you love suffer like that when you can't do anything to help. It's hell!"**

academic papers were produced on topics as diverse as HIV/AIDS and population genetics.

"He profited at our expense," said Larry Baird, who offered his blood, and the blood of his children, for what he saw as a "very important study".

"We were of the understanding that we would have the results of the study within a year, but he never told us anything after. He disappeared," said Baird. "He published more than 200 papers and became the top guru in his field because he was carrying our blood around with him. He used us like cheap guinea pigs, and that incenses me."

**EFFECTS OF ARTHRITIS:**

People living with rheumatic diseases such as arthritis will do just about anything to ease the suffering.

"Having arthritis pain is like a constant toothache. You can't get at it or do anything about it. It just robs you of your power and energy," said Baird, who suffers the debilitating effects of the disease as his late mother did, and as his daughter is now beginning to experience.

Ahousaht Elder Cosmos Frank cares for his wife of 55 years, crippled with the same form of arthritis that took the life of his oldest son.

"Our family has been hit pretty hard by arthritis. My wife Katherine, and four of our daughters all have it. Some days my wife can't even walk. It's really, really hard to watch someone you love suffer like that when you can't do anything to help ease their agony," he said, coming

**"We were of the understanding that we would have the results of the study within a year, but he never told us anything. He disappeared," said Larry Baird. "He used us like cheap guinea pigs, and that incenses me."**

close to tears. "It's hell."

In 1999, their eldest son died of pneumonia at 47 years of age. Frank believes his son succumbed to the respiratory condition because he was blooded from a ten-year battle with a crippling form of arthritis.

**"We were of the understanding that we would have the results of the study within a year, but he never told us anything. He disappeared," said Larry Baird. "He used us like cheap guinea pigs, and that incenses me."**

There is no cure for any of the many forms of rheumatism and arthritis that affect the Nuuchah-nulth, and according to Larry Baird, many people spend hundreds of dollars each month on pain relief medications, which exacerbates an already difficult situation for those who are impoverished or unemployed because of the debilitating effects of the disease.

**FRAUD:**

Ward's consent form made it clear that the study was about rheumatic disease. But at the same time he was drawing blood samples in Ahousaht, he was interviewed by a BBC television crew for a documentary called *In Search of the First Americans*, and he said he was tracing the evolutionary history of First Nations by studying their DNA.

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## Navajo Nation reconsiders ban on genetic research

Tribal leaders are developing a policy for genetic research and data sharing, potentially ending a 15-year moratorium.

Sara Reardon

06 October 2017



PDF



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*Ricky Caroti/The Washington Post/Getty*

Children play on the Navajo Nation's vast reservation in the southwestern United States.

## The Navajo Nation

No genetic research since 2002

Now reconsidering because:

- new Navajo oncology centre
- DNA-informed treatments

Current discussions re genetic research:

- Navajo oversight
- what types of research
- who will have access to data

<https://www.nature.com/news/navajo-nation-reconsiders-ban-on-genetic-research-1.22780>

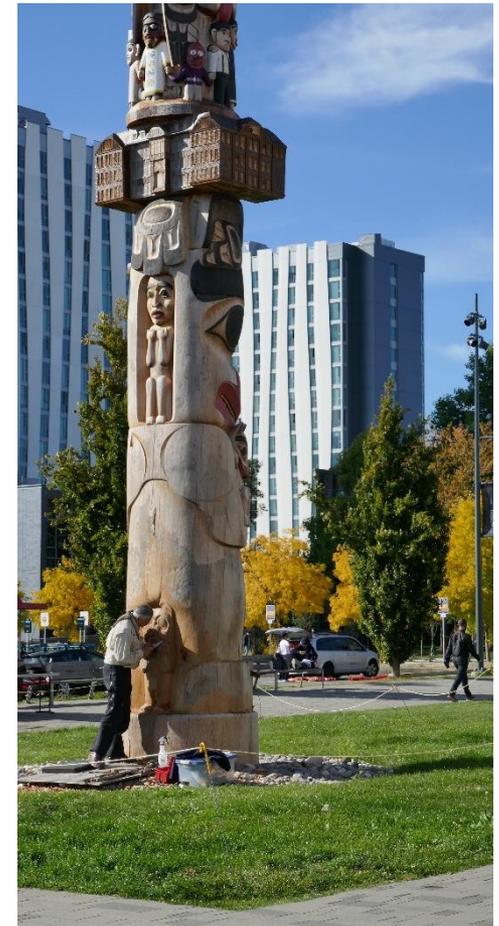
# An ethical research approach

- Cultural safety (Indigenous leadership and informed team)
- Community-based participatory research
- Active facilitation of “co-learning” and to benefit all partners
- Develop understanding of outcomes via an iterative process



# A research partnership

- Participants are invited to choose if and how they want their quotes represented, and identified
- Full participation in the dissemination of findings to all partners
- Who owns the research data?



# Project goals

In alignment with the Truth and Reconciliation Commission's call to identify and close the gaps between Indigenous and non-Indigenous Canadian's healthcare.



Initiate conversations with individuals of Indigenous ancestry:

- Raise awareness of the under-representation in genomic db's
- Voice the Indigenous perspectives, values, and concerns about this.

# Project outline

Opportunity: Genome BC Societal Issues grant: \$50,000

## Design process

- Collaboration and consultation
- Designed the project
  - Exploratory research
  - Community-based participatory research

Practical approach: sharing circle focus groups

- Identified possible communities

# Focus group method

- Elder provides a brief introduction to all, sets the stage for cultural safety and a respectful discussion.
- Introductory video (created for this project) introduces the issues
- The facilitator guides discussion
  - opinions, thoughts...
  - solutions? security?  
confidentiality? usage?  
oversight? is it needed at all?



Roberta Price

# Creation of introductory video



Rachel Coe

## Topics

- Genomic sequencing
- Genomic medicine
- Genomic interpretation
- Lack of Indigenous representation

The video was created in layman's terms, and using culturally relevant and appropriate descriptions.

Introductory video.....

# Five Focus Groups

→ with an expert facilitator, and guided by an Elder, and a Métis scribe

- ✓ Pregnant women from all over BC staying at BC Women's Hospital \*
- ✓ Community participants from urban Vancouver, held at UBC Learning Exchange
- Nov 1** Indigenous students from UBC
- \_\_\_ Community participants from a local band
- \_\_\_ Participants from a rural First Nations community

# Focus group analysis

Our team:

- audio recordings → transcribed
- thematic analysis
- mapping the nature and range of themes and the associations between them
- noting context, intensity, consistency, frequency, and unusual opinions
- select quotes to demonstrate varying perspectives

# Draft of findings

## → Draft report

- Manuscript to summarize themes and ideas that evolved from all focus groups

## → Draft touchpoint video

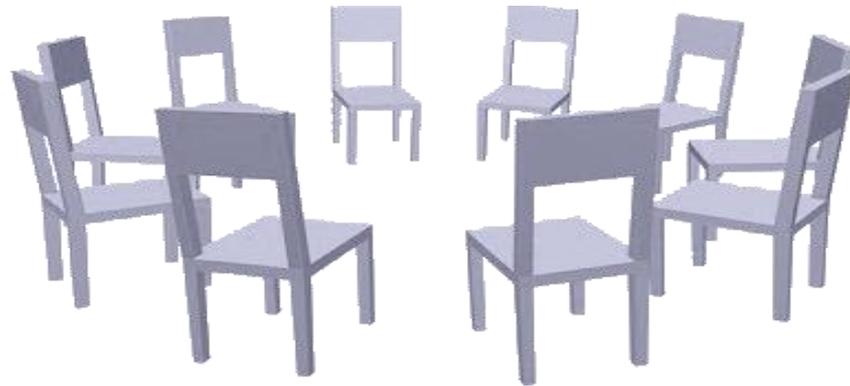
- Touchpoints are key points and themes that resonate with participants
- Two parts:
  - a) introductory video – this issue and genomics
  - b) quotes selected that share the diverse viewpoints of participants



# Back to the community

## Community-based participatory research

- discussion of team's interpretation of draft report with participants
- verify/edit selection of audio clips with participants
- redaction and reinterpretation to finalize report and video



# Limitations....

- Recruitment may not go as planned!
- Small study, representing the opinions of a few
- Five groups will not represent the demographic diversity of BC
- Focus groups/Sharing circles can be unduly influenced or driven by the ideas of a few
- Our introductory video and our facilitator's questions can also influence the outcomes

We hope this is just a start.....

# Acknowledgements

We thank the participants who have given their time and thoughts to this project and our many colleagues for their invaluable contribution and support.

This project is funded by a Genome BC grant to Jenny Morgan and Patricia Birch  
July 1, 2017 – June 30, 2018

# Indigenous Peoples & Genomics: Starting a Conversation

If you are an self-identified Indigenous adult, you are welcome to participate.

The follow-up sharing circle will be in the spring term.

Lunch and \$40 honorarium provided.

**12-2pm on Wednesday, Nov 1, 2017 at UBC**

**RSVP: [patricia.birch@ubc.ca](mailto:patricia.birch@ubc.ca)  
604-875-2000 ext. 5622**

**For more info: <http://friedmanlab.org/IPG>**

**In partnership with BC Women's & Children's Indigenous Health program.**

