

Dwarf Star



rsbo

RÉSEAU DE RECHERCHE EN SANTÉ
BUCCODENTAIRE ET OSSEUSE

FOREWORD

Science is intimidating for the average person. Scientific studies are all too often explained in a clinical manner, the subject matter is advanced and complicated to understand... Consequently, it is easy to believe, wrongly, that researchers are disconnected from the general public. Their projects, therefore, remain generally unrecognized and unappreciated, while false information flourishes and becomes more attractive.

Research into oral and bone health is particularly unpopular. There is a general tendency toward denial: this field of expertise elicits aversion, since it is too often associated with pain (fractures) or even disgust (oral infections, oral cancer, etc.).

This collection has the mission of reversing this tendency by informing you of major advances in the field. We want to show you what health research is and share our passion with you. Research is one of the drivers of humanity, but researchers must better communicate and explain how their work contributes to the welfare of individuals, the environment, and society.

In order to highlight the research and its members in an original way, the Network for Oral and Bone Health Research (RSBO for "Réseau de recherche en santé buccodentaire et osseuse") retained two artists in residence, Daniel Ha and Martin PM. For more than a year, Daniel and Martin met with our researchers across Quebec and visited their labs. In the following pages, you can read and enjoy their comics, and thereby discover along with them, the extraordinary work being done by our researchers.

We hope that these pages will inspire you and allow you to see the scientific research in the field of oral and bone health with new eyes. Perhaps it will elicit among the younger crowd the desire to study the sciences and, who knows, become researchers themselves?

RSBO Art and Science Committee

Dr. Christophe Bedos, RSBO Director

Dr. Argerie Tsimicalis, Researcher and RSBO Member

Dr. Marta Cerruti, Researcher and RSBO Member

Dr. Andrée Lessard, RSBO Manager

Martin Patenaude-Monette, RSBO Artist in Residence

Daniel Ha, RSBO Artist in Residence

WHAT IS IT?

WHAT IS THE RSBO?

For more than 25 years, the Network for Oral and Bone Health Research (RSBO for “Réseau de recherche en santé buccodentaire et osseuse”) tirelessly supports Quebec researchers and their students in the pursuit of excellence in fundamental, clinical, and epidemiological research. The Network numbers more than 100 researchers and over 300 students predominantly from McGill University, Université de Montréal and Laval University, as well as their affiliated hospitals (notably CHU Sainte-Justine, Shriners Hospitals for Children-Canada, Montreal General Hospital, Jewish General Hospital and Montreal Sacred Heart Hospital).

The RSBO network is funded primarily by the “Fonds de recherche du Québec – Santé” (FRQS). It also relies on partnerships with associates from different backgrounds, notably professional organizations in the field of oral and bone health as well as associations which represent the most underprivileged people in our society. This is how the RSBO network brings together the stakeholders in our social fabric – scientific community, clinicians, populations and users of healthcare services, as well as administrators, decision makers and industries – with an eye toward producing knowledge on health and oral and bone diseases, but also to take this knowledge and apply it.

The actions of the RSBO network fall within the national strategies for promoting health as well as those set forth by the World Health Organization. The Network aims to promote the health and welfare of the Quebec population, to reduce inequalities in healthcare, but also to contribute to the economic and social vitality of Quebec. Actions taken by the RSBO network can, in fact, stimulate the retention or return to employment of more vulnerable people, develop highly qualified personnel, generate the development of new technologies, or encourage scientific entrepreneurship and the production of patents.

Transmitting knowledge is one of the major goals of the RSBO network. This is why we created the Art and Science Committee, which promotes scientific research and health of the Quebec society through the arts. The RSBO network considers that sciences and the arts, far from being antithetical, can in fact mutually feed each other, combine, and ultimately, benefit the entirety of the population.

This comic collection is a creative and original way to raise awareness in our fellow citizens about research done here, especially on a subject like oral and bone health, which can be quite off-putting for the uninitiated. And yet, the research we are doing is fundamental for all of us.

The idea of doing a collection of comics is exactly right coming from the RSBO Art and Science Committee, and a great approach to demystifying everything that happens in our mouth, from the effect of sugar on our teeth to oral ecology, as well as 3D technology to foster stronger bones, and other activities which take place between our nose and our chin...

Due to its excellence in research, the Network is supported by the "Fonds de recherche du Québec – Santé" (FRQS). It seems so very pertinent and important to me that the general public better understand the research being done since, in the end, it is they who benefit from it, even if they don't realize it.

At a more basic level, it is important to raise awareness concerning science and research in the general population: the methods, approaches, questions, and uncertainly, but also the discoveries, results, and accomplishments! It is important to increase the number of opportunities to present science to the population, young or old, so that scientific expertise becomes the first instinctive source we turn to when we ask questions on any particular subject. Calling on art is definitely a good way to stimulate curiosity.

I commend the Network for its initiative in raising awareness for its expertise and projects, and perhaps generating interest among the new generations of students who are wondering about their future. Who knows? Perhaps, despite a little bit of apprehension, this comic collection might help you better appreciate your next visit to the dentist!

*Rémi Quirion,
Chief Scientist of Quebec*

DWARF STAR



PHILIPPE CAMPEAU, M.D.

*Medical Geneticist and Assistant Professor at Université de Montréal
CHU Sainte-Justine Research Center*

It is the great Hubert Reeves who said that we are comprised of stardust. Dr. Philippe Campeau explains to us how our tiny genetic constituents can lead to dwarfism, or other conditions in people with dwarfism. Fundamental research helps us understand certain conditions and, consequently, fight against all forms of social discrimination. No matter the conditions, we all have the potential to reach the stars!

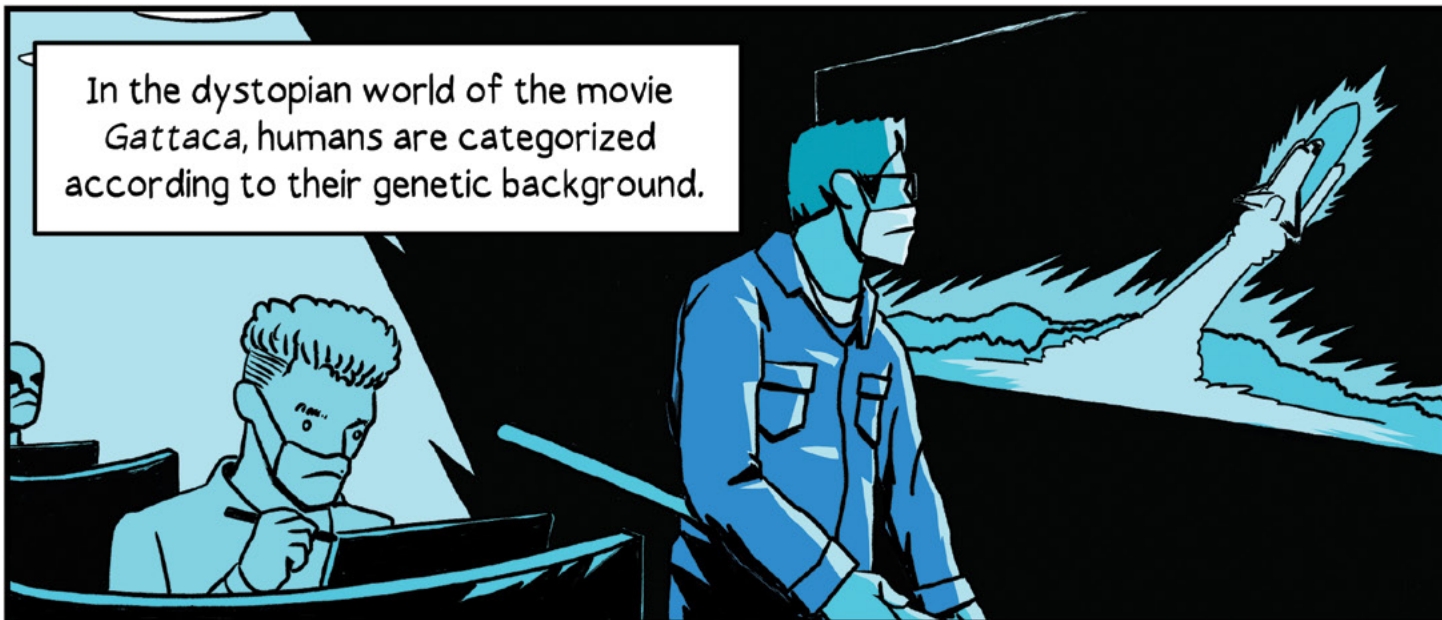


DANIEL HA

Daniel Ha, also known as Daniel Vinh Ha Thé or Hà Thế Vinh, turns out to be a type of hermit who is ordinarily found huddled in his cavern. In the wild, he can sometimes be seen in a metro car. He is distinguished by the quality of being a rare Homo sapiens who prefers the pages of a real book (a comic book in his case) to the screen of a cell phone. In order to earn his daily bread, he palpates tongues, uses a powerful blue laser capable of transforming viscous matter into a solid block, and accepts being splashed with saliva and blood on his face, neck and forearms. From time to time, he draws, but receives no financial benefit from it.

**www.dvhstudios.com
[instagram.com/dvhcomics/](https://www.instagram.com/dvhcomics/)**

In the dystopian world of the movie *Gattaca*, humans are categorized according to their genetic background.



Vincent, the main character, was conceived naturally, or in other words, without genetic manipulation.



By using the genetic material of a superior person, Vincent is hired by the Gattaca Aerospace Corporation, which is organizing a space mission for people with a perfect genetic background.

Thanks to his ingenuity, Vincent overcomes his genetic destiny and achieves his dream to reach the stars.



Houston.

At the Baylor College of Medicine in Houston, contrary to the vastness of space, Dr. Philippe Campeau studied how the infinitely small can make us ... small.

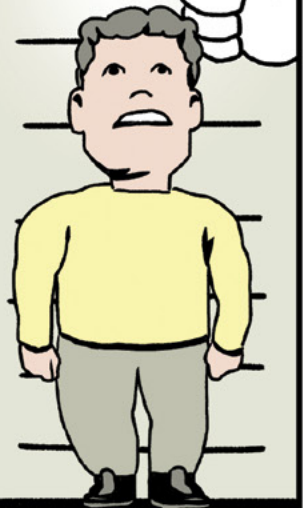
Dr. Campeau is a medical geneticist at Sainte-Justine Hospital.

He mostly treats patients with bone dysplasias (anomalies), which affect 1 in 5000 people.

Skeletal dysplasias often result in growth delays, which lead to dwarfism.

In order to find the cause of certain conditions, ...

147cm



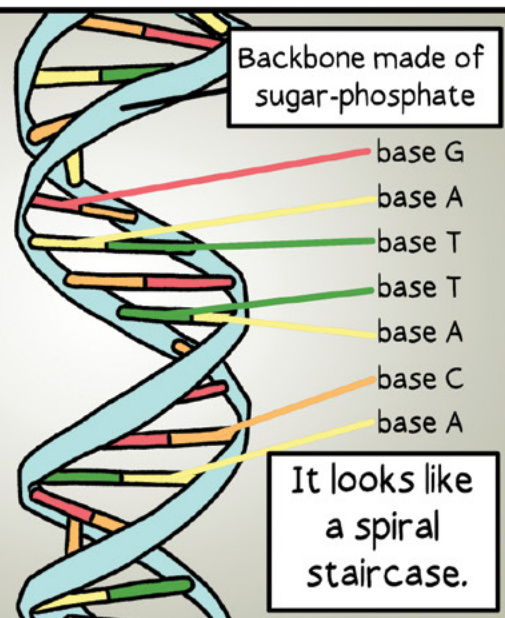
... he must often search in the genetic information of a patient.

A single nucleotide in 3 billion can completely transform the life of a person.

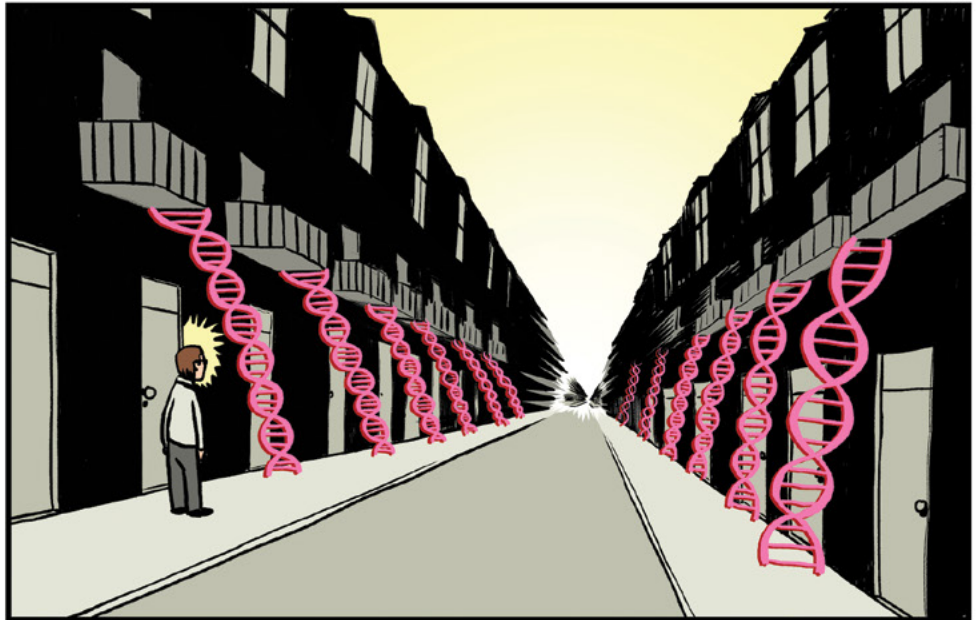
What is a nucleotide?

A nucleotide is a step on the DNA ladder.

This step is made up of a pair of bases: A paired with T or G paired with C.



Dr. Campeau in
Plateau-Mont-Royal.



A gene is a DNA
sequence. Certain genes
provide the recipe
for creating proteins, ...



... molecules which have
many functions in the body.



messenger



structure



immunity

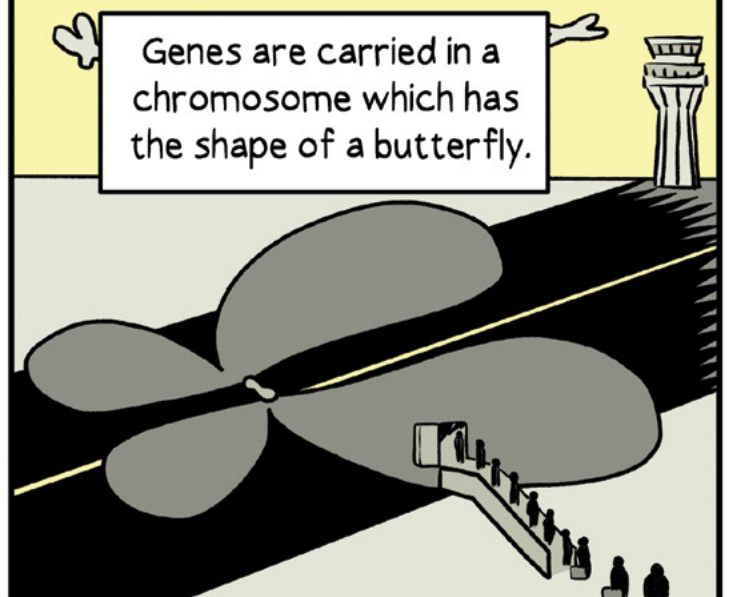
A gene is also the
basic unit of heredity.

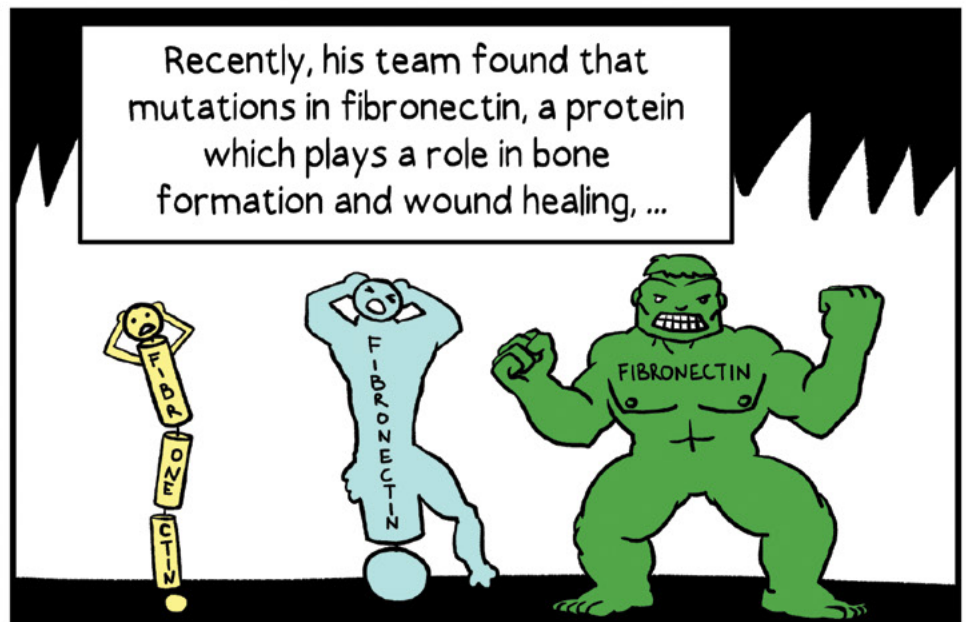
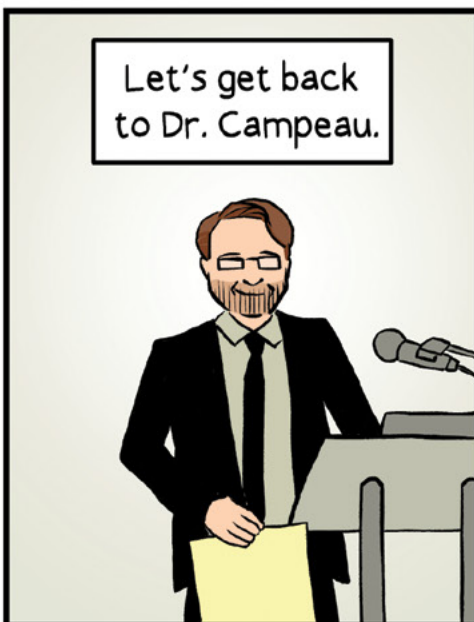
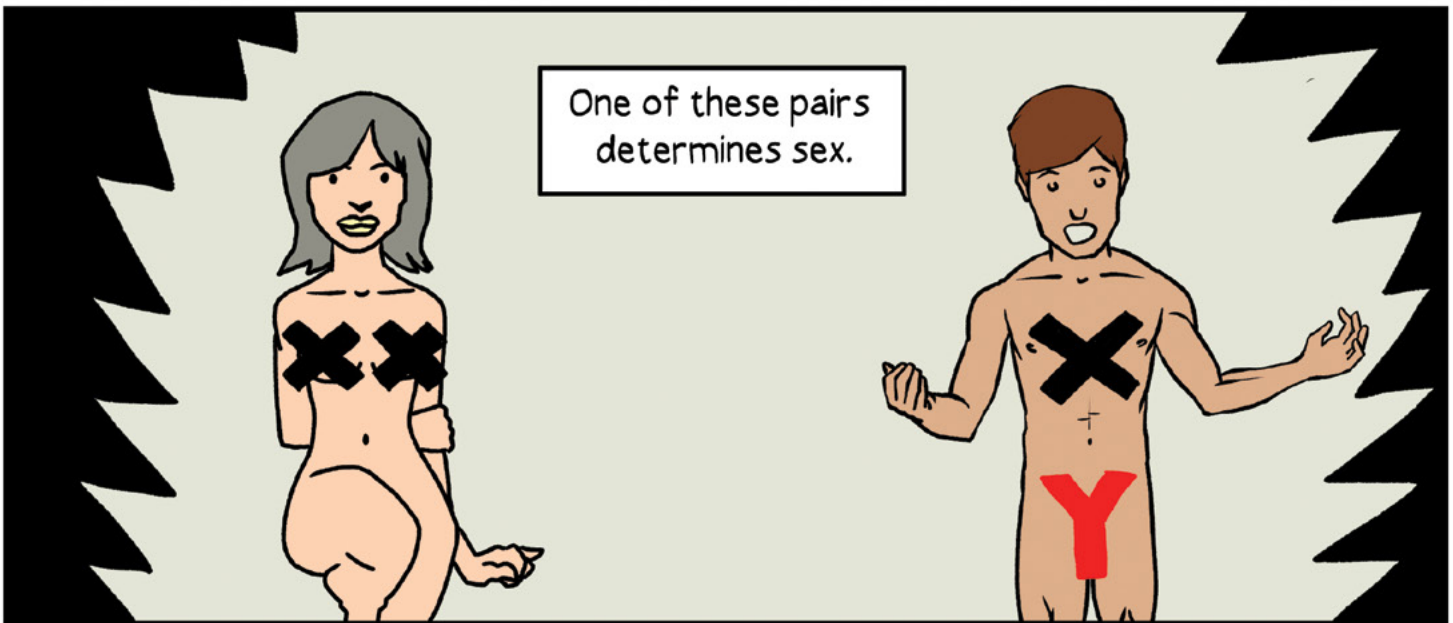
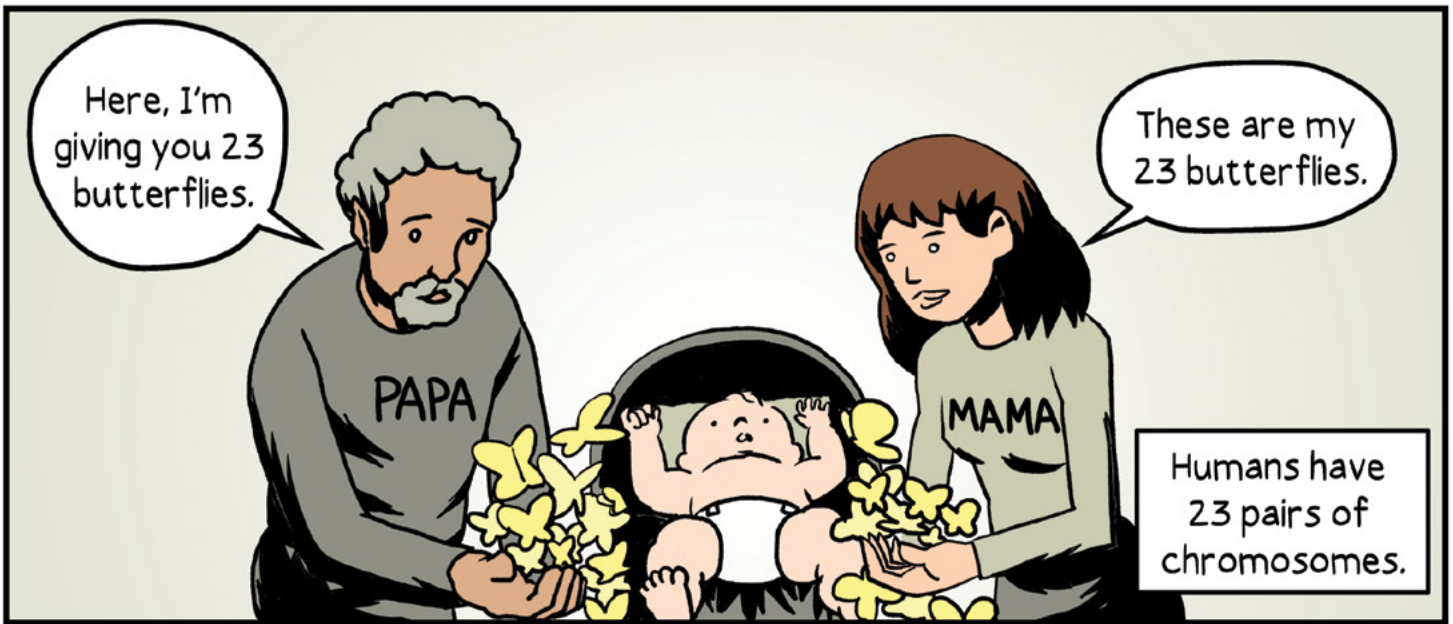
I inherited
all my jeans from
my mother.

A human being has
about 20,000 genes!

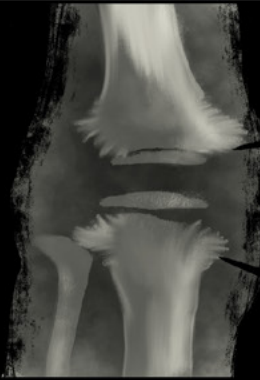


Genes are carried in a
chromosome which has
the shape of a butterfly.





... could explain spondylometaphyseal dysplasia with corner fractures, one of the causes of dwarfism.

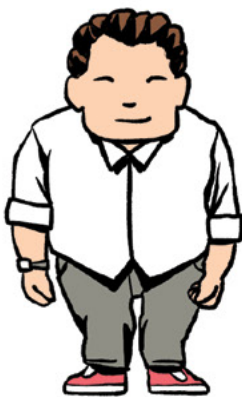


Not real fractures, but triangular malformations which look like fragmentation

This discovery could eventually lead to a treatment for this condition.



The other common causes of dwarfism are Morquio syndrome, diastrophic dysplasia, and achondroplasia.



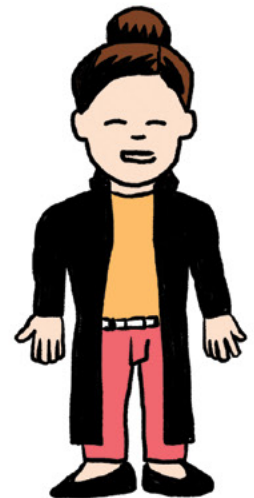
Morquio syndrome: the second most frequent in Quebec, short and wide trunk and neck, very slowed growth after 8 years of age, final height ~100cm, recessive transmission



Spondyloepiphyseal dysplasia: hands and feet of normal size, pronounced sternum, final height ~135cm, dominant transmission



Diastrophic dysplasia: very pronounced curve of the spine, club feet, final height ~120cm, autosomal recessive transmission



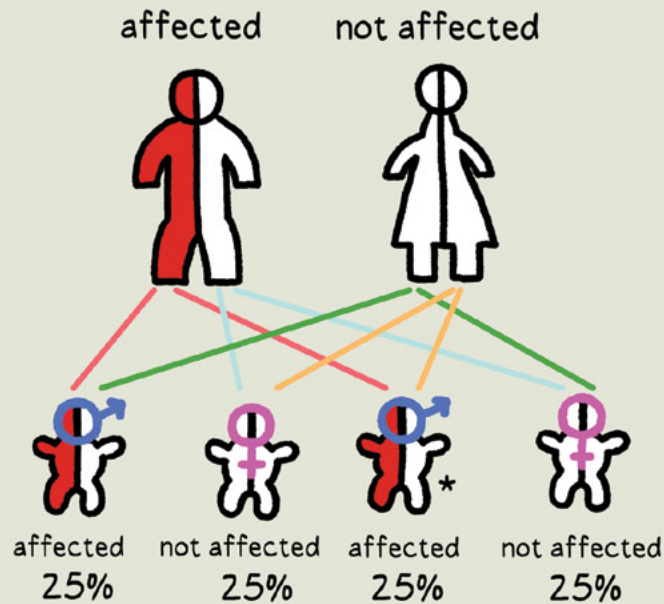
Achondroplasia: the best-known form of dwarfism, shorter arms and legs, larger head, final height ~125cm, autosomal dominant transmission.

In approximately 80% of cases, small people are born into families with no history of dwarfism. They are mostly genetic mutations!

What is
autosomal
dominant
(or recessive)
transmission?

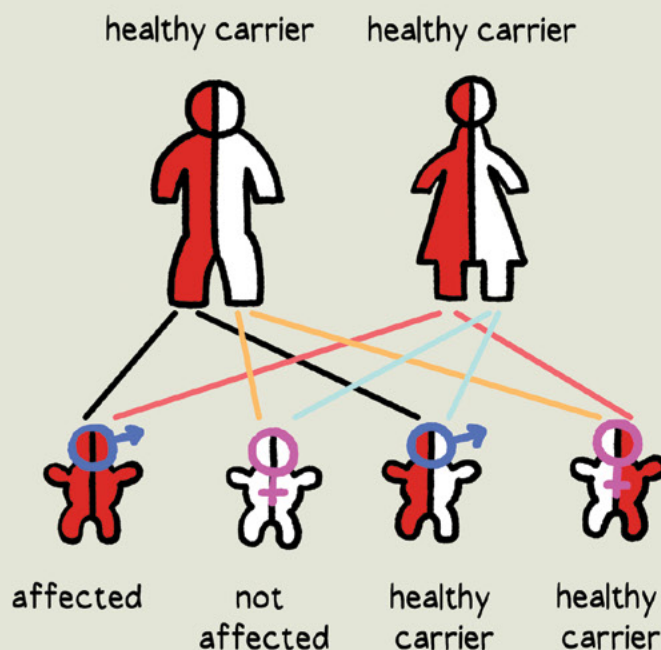
Not this!

An autosome is a chromosome (the butterflies from page 4) which does not determine sex. When we speak of dominant transmission, a single mutated gene transmitted from one of the parents is enough to express the condition.



* can be
a boy
or a girl

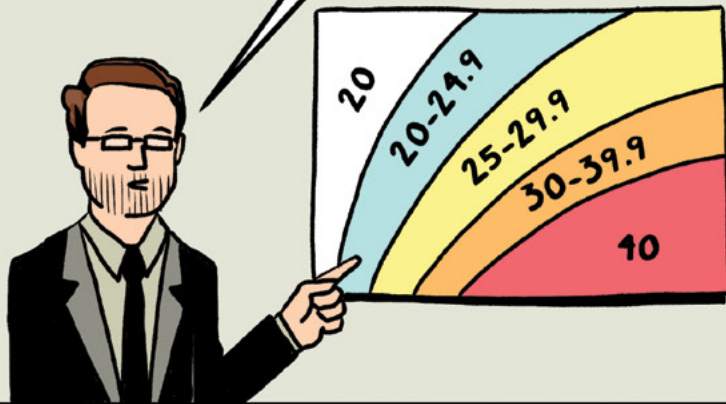
On the other hand, with recessive transmission, both parents must transmit a mutated gene in order to express the condition. In the case of recessive transmission, a person can be a healthy carrier of the gene.



Oh! And just to add
a little something
about achondroplasia:



People with this condition may also have a higher body mass index since they are small and tend to be less active because of their joint problems.

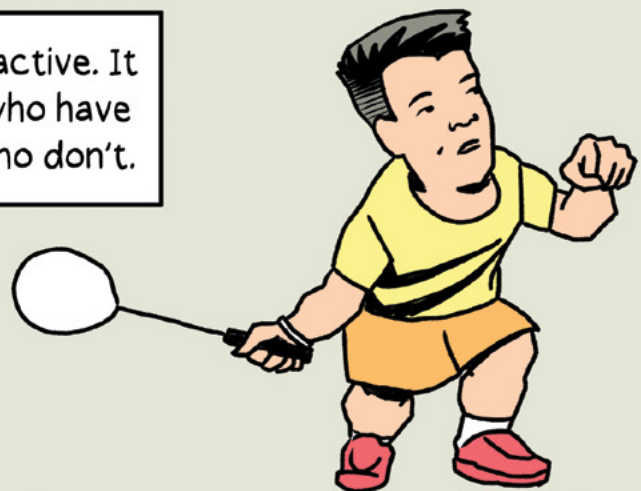


The result is a vicious cycle since weight gain will also contribute to joint problems.



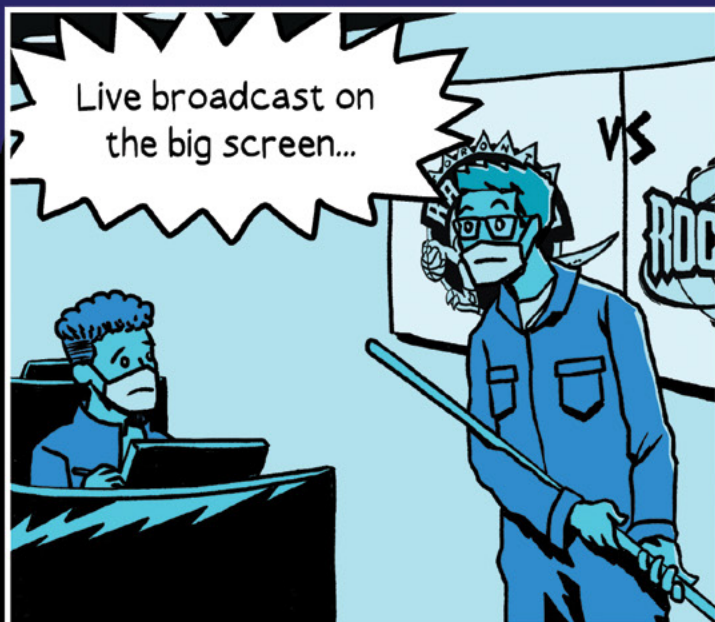
Someone I met decided to become very active. It became his career and he trains others who have achondroplasia as well as some people who don't.

Note from the cartoonist: I recommend watching Born Different Being 3ft1" Doesn't Hold Me Back on YouTube (the person in the video has a form of dwarfism that is not achondroplasia).



He persevered and was able to overcome discrimination, like Vincent.





"For someone who was never meant for this world, I must confess I'm suddenly having a hard time leaving it. Of course, they say every atom in our bodies was once part of a star. Maybe I'm not leaving... maybe I'm going home."

-Vincent F.

For more information on Dr. Campeau and his work:

pcampeaulab.org

The AQPPT (www.aqppt.org) contributed to this work.

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COMICS

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Special thanks to Anthony Hay

ACKNOWLEDGEMENTS

The RSBO network thanks its partners



Daniel Ha

I would like to thank the RSBO network (especially CB and AL) for having given me this opportunity. Without the talent, know-how, and experience of my colleague Martin, I am convinced this book would not exist. Diego, Aya and JS gave me their precious time and constructive advice. My parents, my sister and my brother have delivered groceries and meals during lockdown (OK, they did so during normal times, too). Thanks to M. Hay for their participation. Thanks to CB (a different one) for their collaboration, and for having made us look good. And finally, thank you to MGT, my haven.

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