

lab   street

Get inspired and create

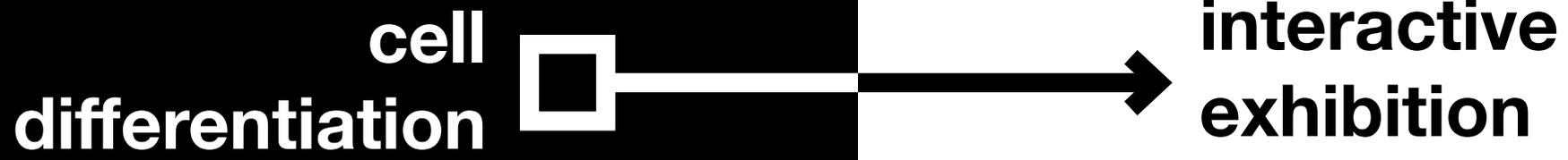
C

Everything!

Find here a couple of examples of what can be done using the Tangible Science Framework. During 3 years, designers and biologists have collaborated inside the ChromDesign network to develop many projects to bring the lab's science to society in various innovative ways. Each journey was different, and yours can be as well! Get some inspiration and start your own project.

Carla Molins- Pitarch

2022



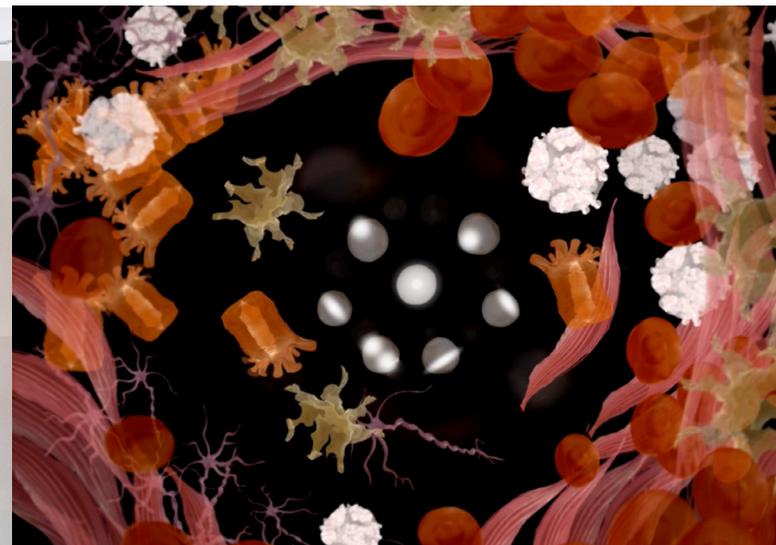
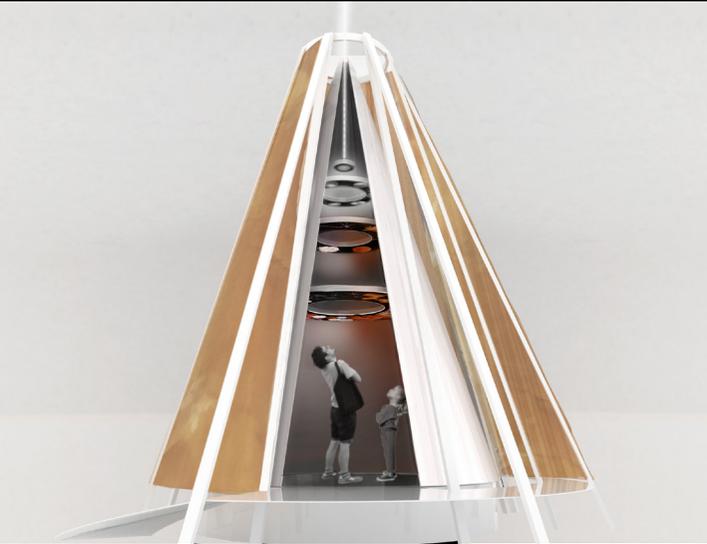


LIVING FORM

All living beings are made up of cells, depending on the complexity, a being can have a few cells or billions of them. Therefore we can say that cells are the smallest unit of life that exists, a cell to understand us, it is the smallest living organism that can be found right now on earth.

Like all living organisms, it needs to perform the vital functions that are relating, nurturing and reproducing. Every living organism has developed in a different way in order to carry out these vital functions as efficiently as possible, after all, that is what life is all about. Survive tricks and reproduce by replicating a life that uses those tricks. Make a copy of that winning formula. Since the beginning of time, the forms of life in attempts have become more effective in their survival and therefore have evolved and become increasingly complex and diverse. But for all this to happen there is an elemental factor for life, and yet totally invisible to our eyes, to study and understand it clearly we must go back to that cell that told you the principle more specifically to the nucleus, there we found a tangled winding structure similar to a ball of wool that apparent chaos is called DNA, and it is an embedded code that contains all the information of a life.

LIVING FORM
CELL DIFFERENTIATION
JAVIER DOMINGO



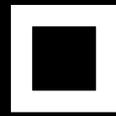
**fundamental
genetics**



**AR
educational
tool**



**chromosomal
alterations**

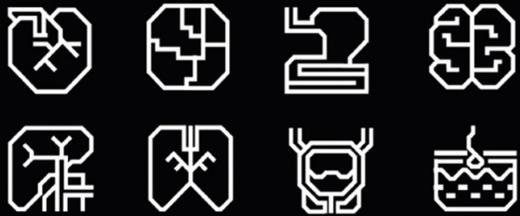


**kinetic
interactive
object**

**rare
diseases**



**visual
system**



THE 'RARE' HERALDICS

El diccionario visual de las enfermedades raras.

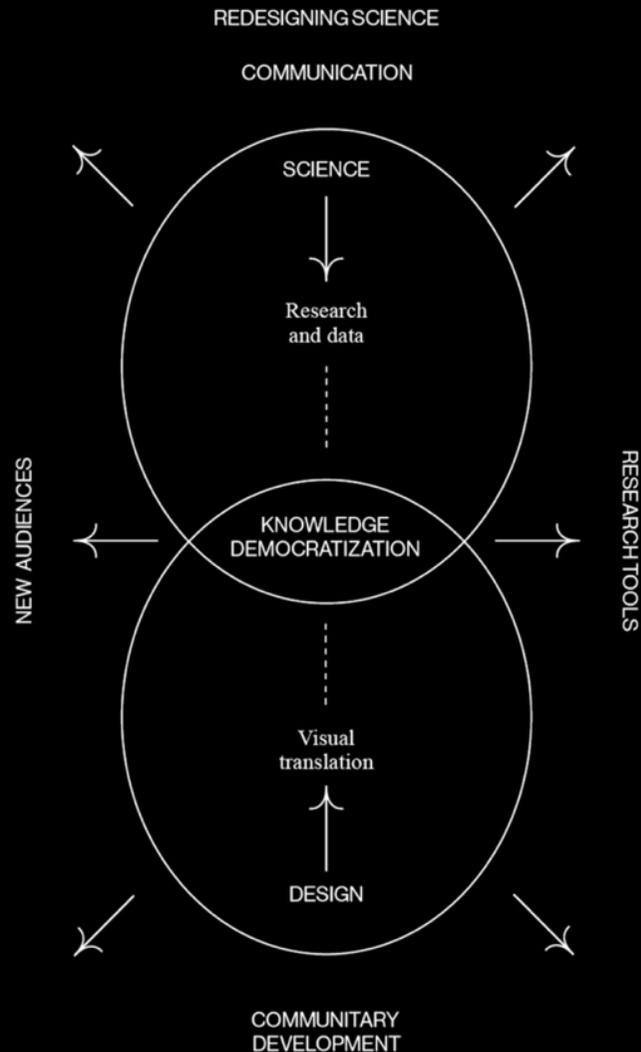
x

CHROMDESIGN

<< Language is the foundation of civilization.
It is the glue that holds a people together.
It is the first weapon drawn in a conflict >>

Visual language can overcome the traps of verbal language, becoming universal

THE 'RARE' HERALDICS
RARE DISEASES VISUAL SYSTEM
YOLANDA JUSTICIA





THE BIRTH BANNER

YOU ARE NOT THAT RARE

THE BIRTH BANNER

And what is this change? Luckily for all of us, there is large support... that has grown with the years. To this day we can talk about multiple associations and organizations such as "The Global Genes Project", one of the leading world organizations for patients of rare diseases. Led by the "Team R.A.R.E." (R.A.R.E. that stands for "Rare Disease, Advocacy, Research and Education"), Global Genes promotes the necessity of a community for people with rare and genetic diseases. It is this mission (along with the creation of a new scientific communication tool that we are in for and our new language) that has been understood, recognized, and joining the community even closer than it was before.

THE BIRTH BANNER

UNITING AROUND THE WORLD

FOR A CLOSER COMMUNITY

THE BIRTH BANNER

PASSPORT

THE BIRTH BANNER

In order to understand the language that will define this community, that will help to understand the origin. A huge part of our identity comes from... family, birth places. Where do rare diseases come from? Although not all of them come from the same place, we could say that almost all of them have a common beginning: genetics. When we are conceived, we receive DNA from our parents, and it is throughout this process that something happens, something that will define our possibility of having a rare disease. When generations their natural function, our bodies make it. As a consequence, we might develop certain symptoms or alterations in our daily life that, as our social or cultural background changes, is what defines the origin of rare disease and, consequently, THE BIRTH BANNER.

THE BIRTH BANNER

When entering the world of genetics in rare diseases, there are three questions that you have to ask yourself... THE BIRTH BANNER. Just as we have been trying to understand a person and we asked where were you born, how and what type of family? Through our communication we need to define our family by determining its origin. First, ... is the alteration produced? By answering this, we determine in which chromosomes located the alteration as well as the part of the chromosome. Second, ... is the alteration produced? In this case we determine whether the disease is hereditary and/or not. If it is a syndrome that implies multiple alterations. To finish, we need to ask ourselves: ... of genes is altered. It will not be the same gene that produces protein than one that does not or the possibility of a mutation of the gene.

THE BIRTH BANNER

What is this new language all about? As we previously said, rare diseases, as people, follow common paths. But everyone has its own traits and personality. In this path, we have defined three traits from the most to the least visible: the top of the banner that reflects directly in the social parameters, the personality of the disease (medical parameters) and its origin (biological parameters). In order to create the language, we have translated all the ... into visual objects and attributes that will create a new universal way to understand rare diseases through the eyes, generating ... of banners that each patient can create through his own. This language 'speaks' a new way to speak for the community, but especially a new way to learn.

1. A NEW WAY TO SPEAK. 2. A NEW WAY TO LEARN.

THE BIRTH BANNER

WHO ARE YOU? IDENTIFY YOUR TRAITS.

THE BIRTH BANNER

THE BIRTH BANNER

PREVALENCE

THE BIRTH BANNER

DISABILITY

THE BIRTH BANNER

INHERITANCE

NOW IT IS THE TIME TO CREATE

THE BIRTH BANNER

RECKON YOUR TRAITS & BUILD YOUR BANNER

THE BIRTH BANNER

1. SELECT THE BASE
2. TAKE YOUR SYMBOLS
3. ORDER THEM
4. WEAR IT WITH PRIDE!

THE BIRTH BANNER

THE BIRTH BANNER

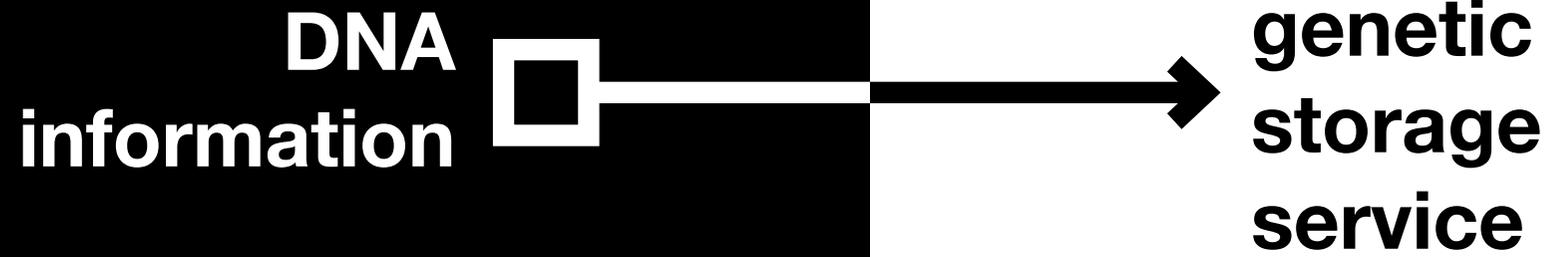
THE BIRTH BANNER

For years, language has been the bridge between different cultures and people. However, understanding a language is not useful if you are not spoken to in your own language. With our rare banners, the objective of generating clear and wider connections within thousands of rare diseases. We have revealed the calls behind them, demonstrating that banners are not only accessible for all the stakeholders. With the creation of these banners, we do not only find a new easier way to communicate, we connect in the light for our families we have done for many and years. Through the definition of this visual grammar, we can create culture and knowledge inside the scientific framework, we can educate doctors towards a new approach in order to achieve it, we have to start by sharing with others and learning along the way. Because, as we previously said, COMMUNICATION IS SURVIVAL.

THE BIRTH BANNER

THE BIRTH BANNER



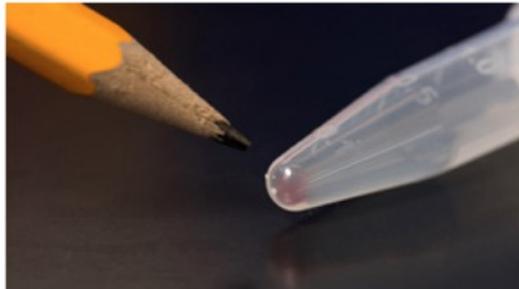




DNA-STR
DNA STORAGE DEVICE
CLEMENTINA ALTUBE

DNA as Data Storage

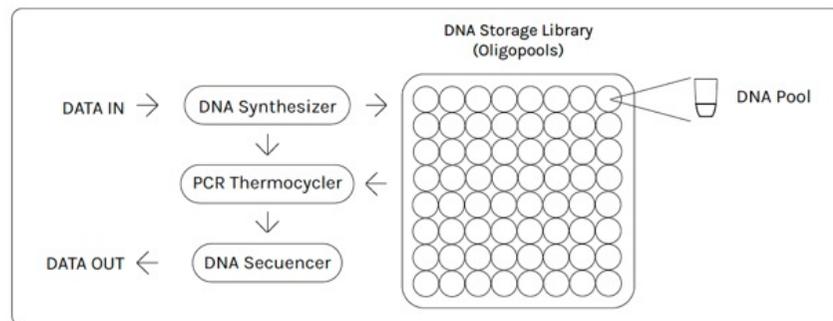
DNA, the molecule that constitutes and dictates the growth of all living things, is being researched as a strong alternative to traditional storage methods (such as tape or HDD). Its complexity and resilience makes it, in many aspects, a suitable candidate to solve the storage crisis.



In July 2020 Microsoft and Washington researchers said they had stored a record 200MB of data on DNA in a space the size of a pencil tip.

There are several reasons why DNA has characteristics relevant to data storage. First, it is composed of four bases (A, C, G, T) while the binary language is base two, allowing the storage of twice as much information. DNA is an extremely dense, three dimensional storage medium with a theoretical ability to store 455 Exabytes in 1 gram; in contrast, a 3.5" HDD can store 10TB and weighs 600 grams today. Secondly, it can be stably preserved for hundreds of years

while in an anoxic and anhydrous atmosphere. Generating in-vitro copies of DNA is relatively cheap and fast, while tape and HDD have bandwidth limitations that can mean hours and days of copying information (Nikolados 2019). DNA sequencing is relatively inexpensive, hovering around 1.000 US\$ for sequencing an entire human genome. Problems arise when talking about DNA synthesis, since it is the most expensive and treacherous part of the process.



GENERIC SCHEME FOR DNA SYNTHESIS AND SECUENCING

DNA to binary

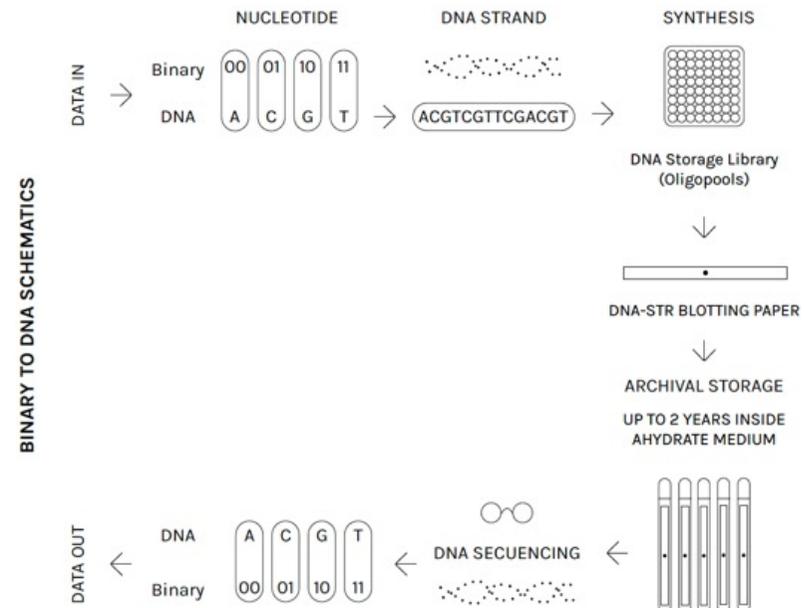
To fully understand the dynamics of translating digital data into physical data (Binary to ACGT), a small script on Processing was written. Since the main objective of the project was set to store images, the code was written using image input. The process encrypts the 8-bit binary information of pixel color to the language of Adenines, Cytosines, Guanines and Thymines.

THE PROCESS OF ENCODING AND DECODING INFORMATION INTO DNA

The first step to encode images into DNA is to deal with the raw data of the image. It is really important to dimension that each pixel contains the code of its blue, red and green composition. Therefore, the amount of DNA letters in the output is three times bigger than the amount of pixels in the image. This has to be taken into account since the amount of nucleotides that can be stored per oligopool unit is limited.

Therefore, this process was a part of the prototyping stage of the project.

The final results are far from perfect, but help dimension the type of data and the amount of data generated when translated an image from binary code to ACGT code.





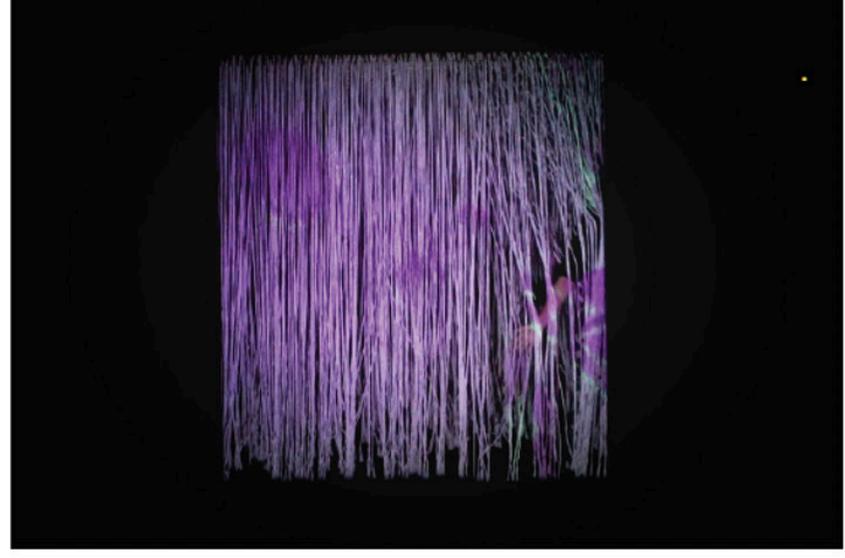
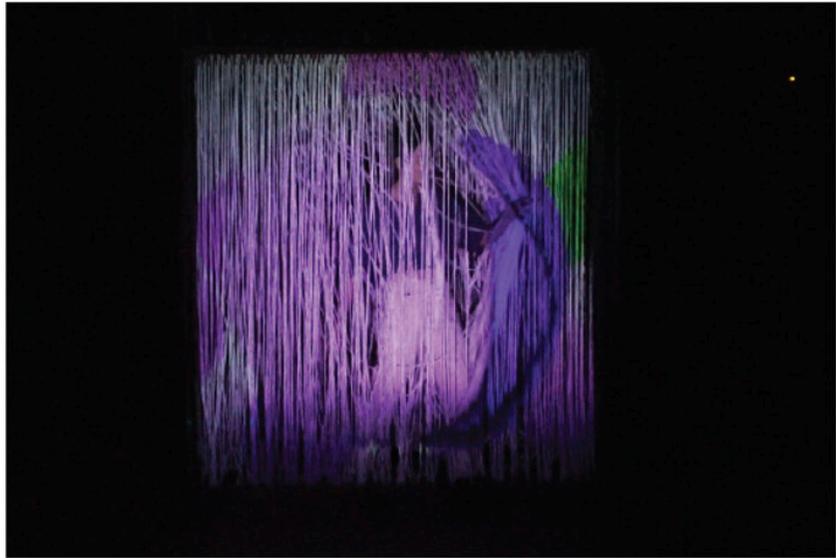
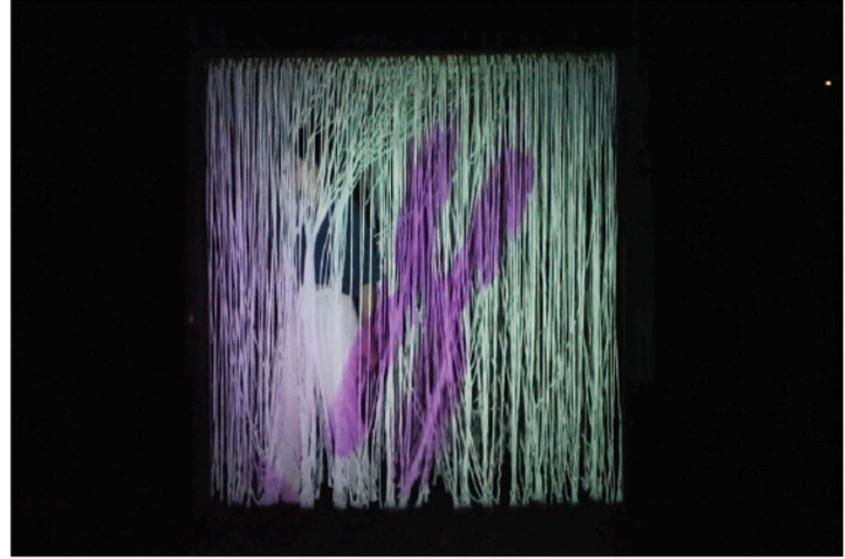
**genome
scales**



**projection
mapping
space**



UNTANGLE HUMAN GENOME
MULTISCALE OF THE GENOME
SANTI BONET



**genetic
heritage**



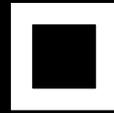
**visual
system**



ANCESTRY RELICS
GENETIC HERITAGE
XIN YE



epigenetics



**environment
reactive
garments**



EPIGEN GARMENTS
EPIGENETICS CLOTHING
TONI BOVÉ





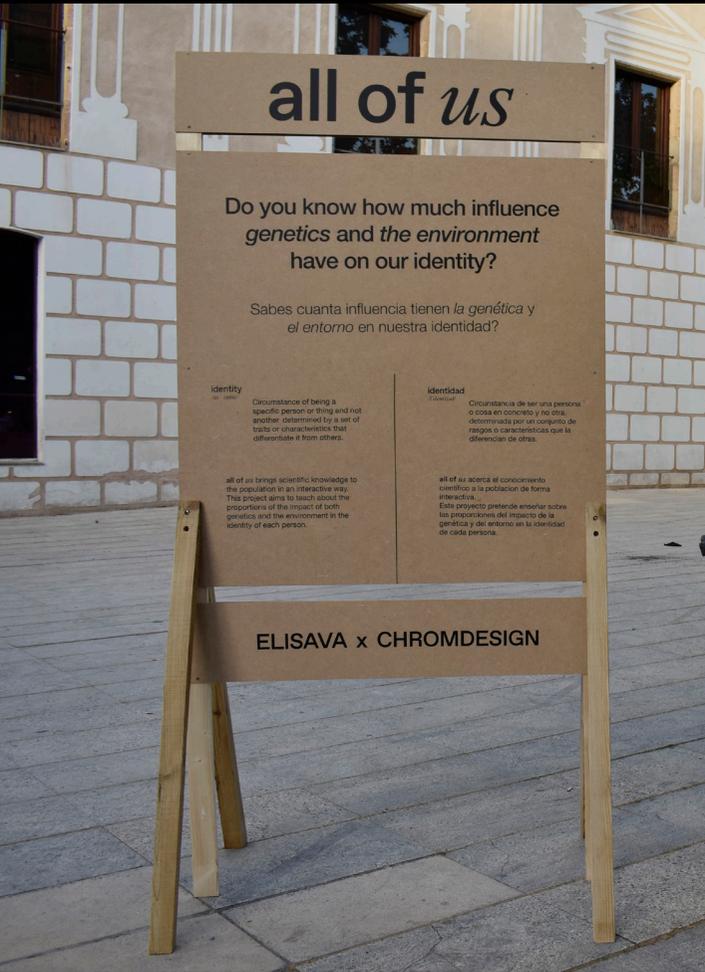
**genetic
identity**

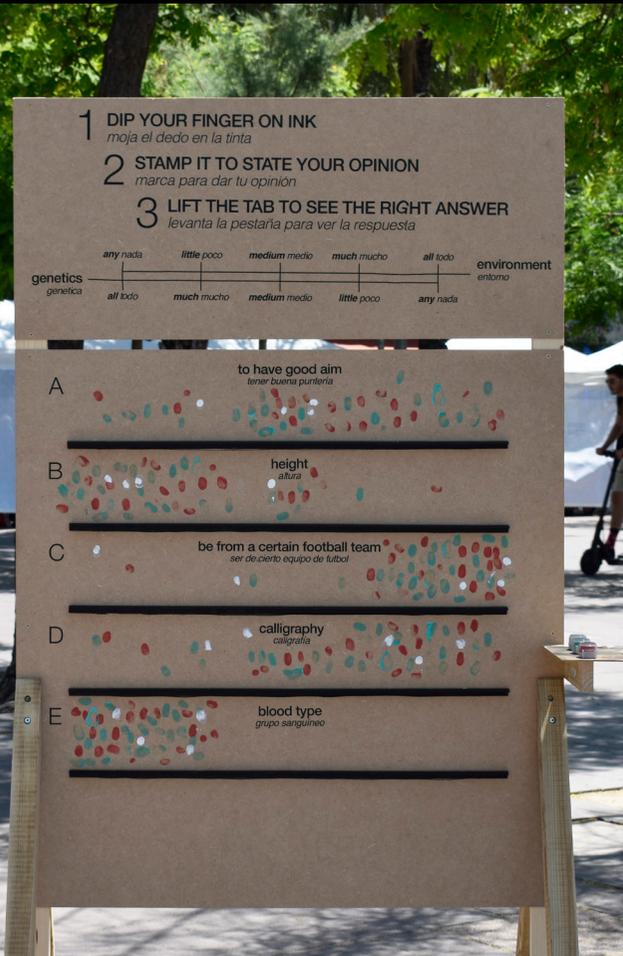


**public
space
interaction**

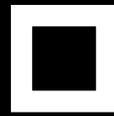


ALL OF US
GENETIC IDENTITY
JUDIT CASTELLS





**chromatin,
DNA & proteins**



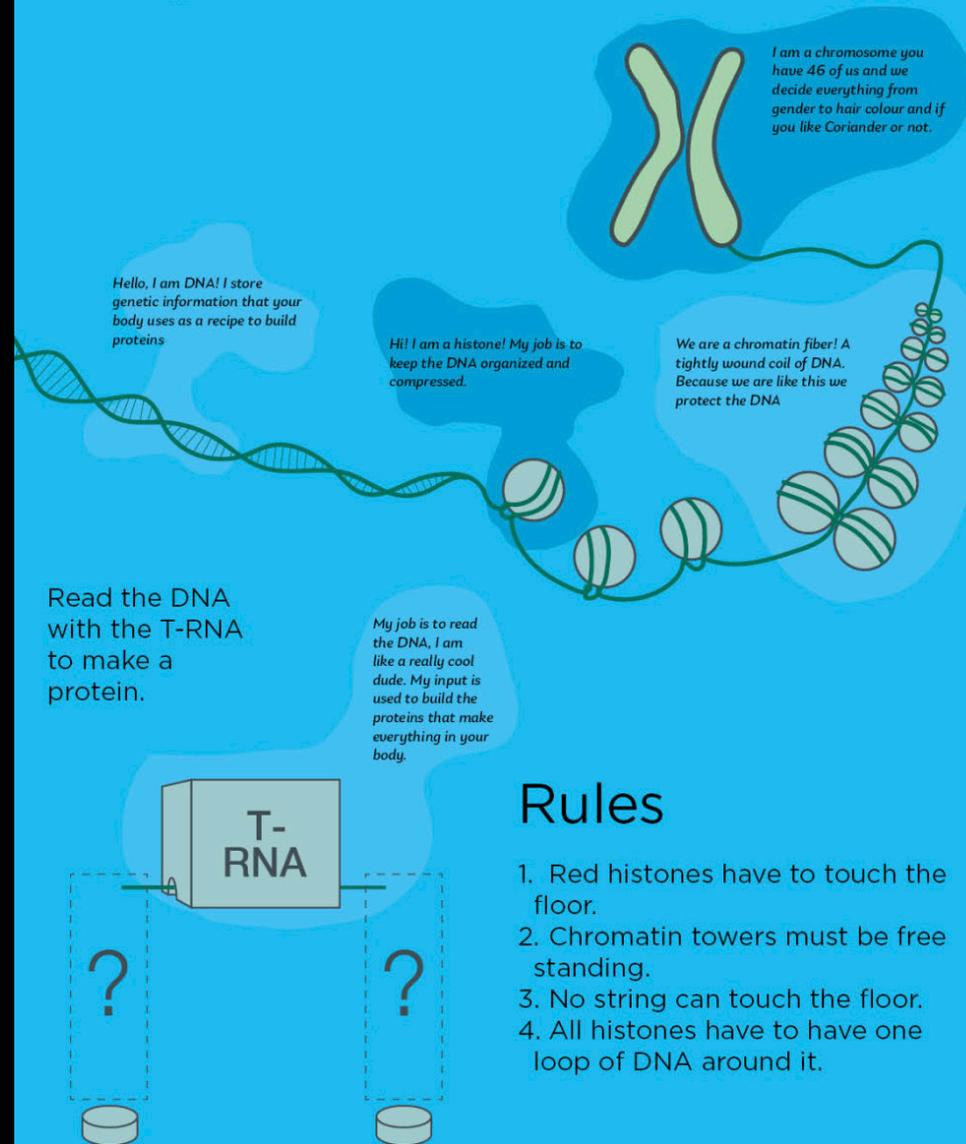
**physical
game**



HOW TO MAKE PROTEINS
FROM CHROMATIN TO PROTEIN
MAGDALENA SAMONIGG & FRIDTJOF AGNALT

Your body makes protein every day.

Can you do the same?

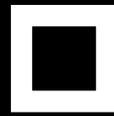


Rules

1. Red histones have to touch the floor.
2. Chromatin towers must be free standing.
3. No string can touch the floor.
4. All histones have to have one loop of DNA around it.



**chromatin
& scales**



**interactive
public space**



ZOOMING IN CHROMATIN
INTERACTIVE PUBLIC SPACE CHROMATIN
DIANA BOLTERS DORF & PIETRO FORINO

Hey you!
Exactly you!

What are you
thinking about
right now?

How many
questions do
appear in your
head in this
exact
moment?

I have one
more
question to
you...

But first...
come closer

How many
meters of
genetic
information is
contained in
your body?

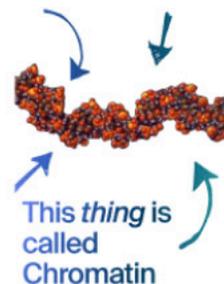
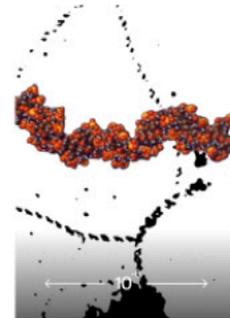
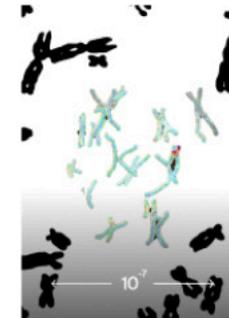
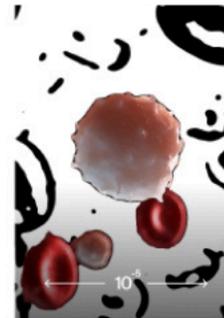
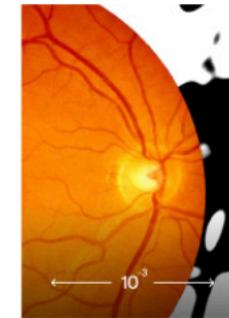
Let's find out!

Thousands

Millions

Billions

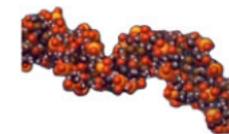
This is you.
Zoom in to
discover the
answer!



Chromatin
allows us to
condense **67.7
billion** metres
of genetic
information



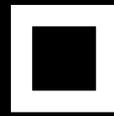
allowing us to
live our daily
life mostly
without any
problems.



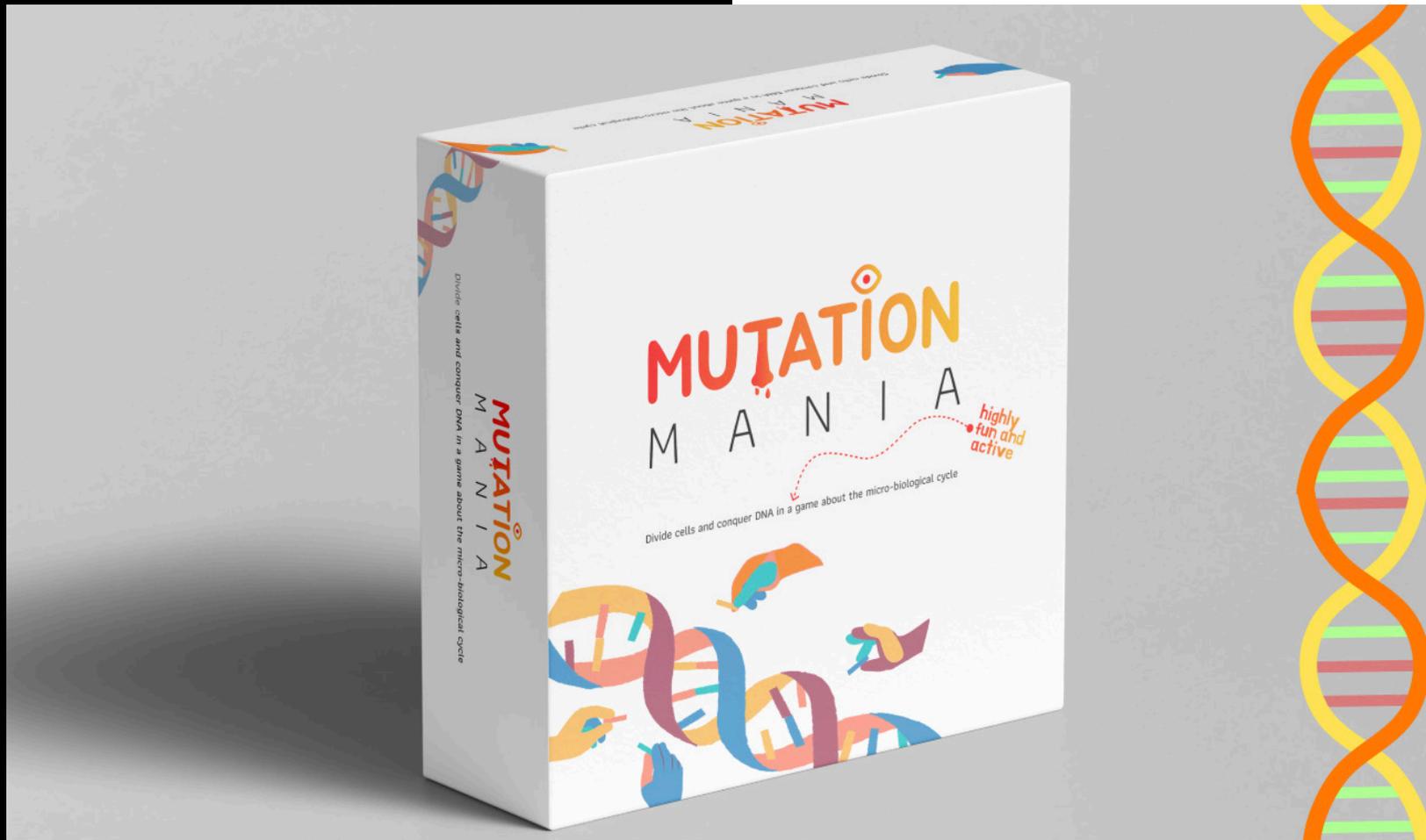
So if this tiny
part of our
body can
manage that
huge amount
of informations,
you can also
manage your
daily problems!



**chromatin
& cell cycles**



**group public
space game**

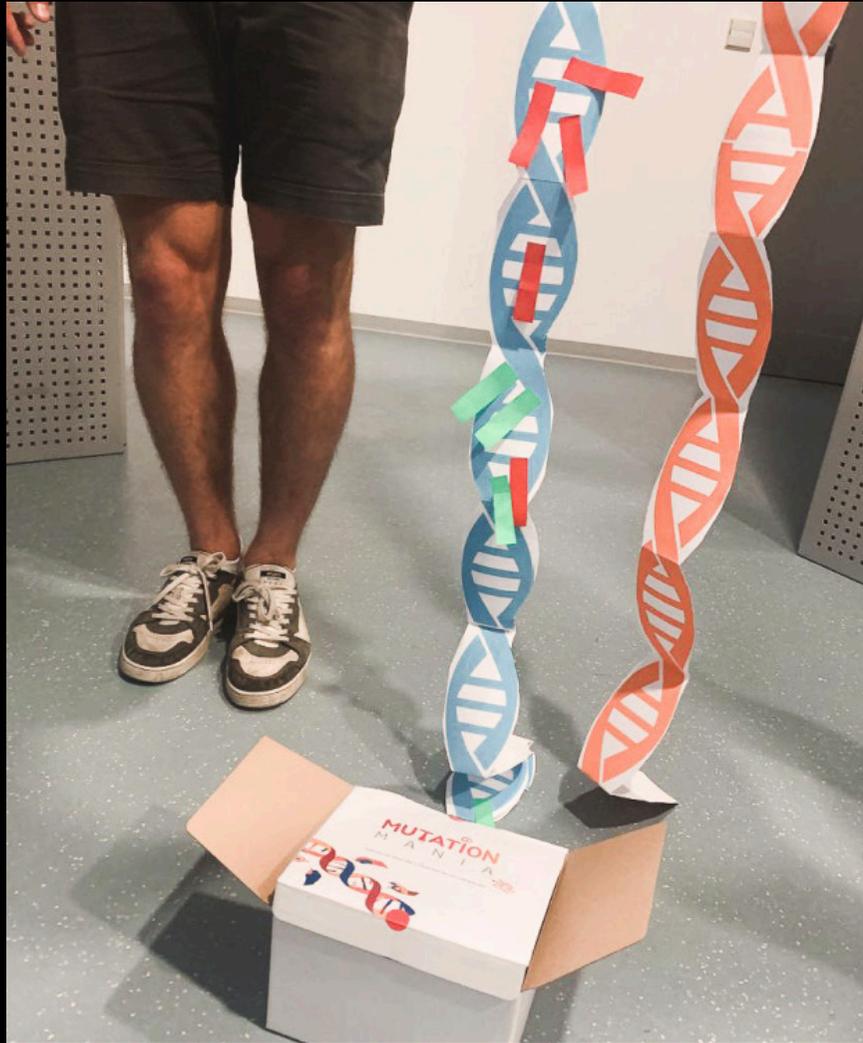


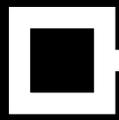
MUTATION MANIA

GROUP PUBLIC SPACE GAME

OLENA DAVLETSYHN & OLE PETER KLÆSTAD





lab   street

What will be yours?

lab   street

