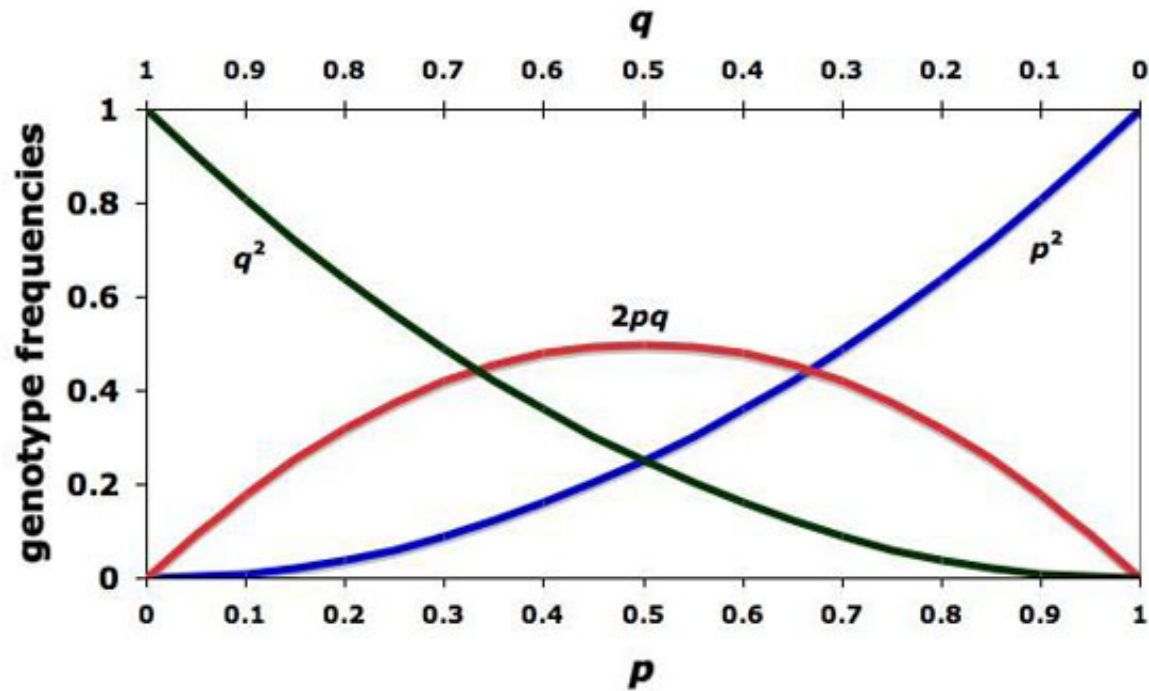


Human Population Genetics

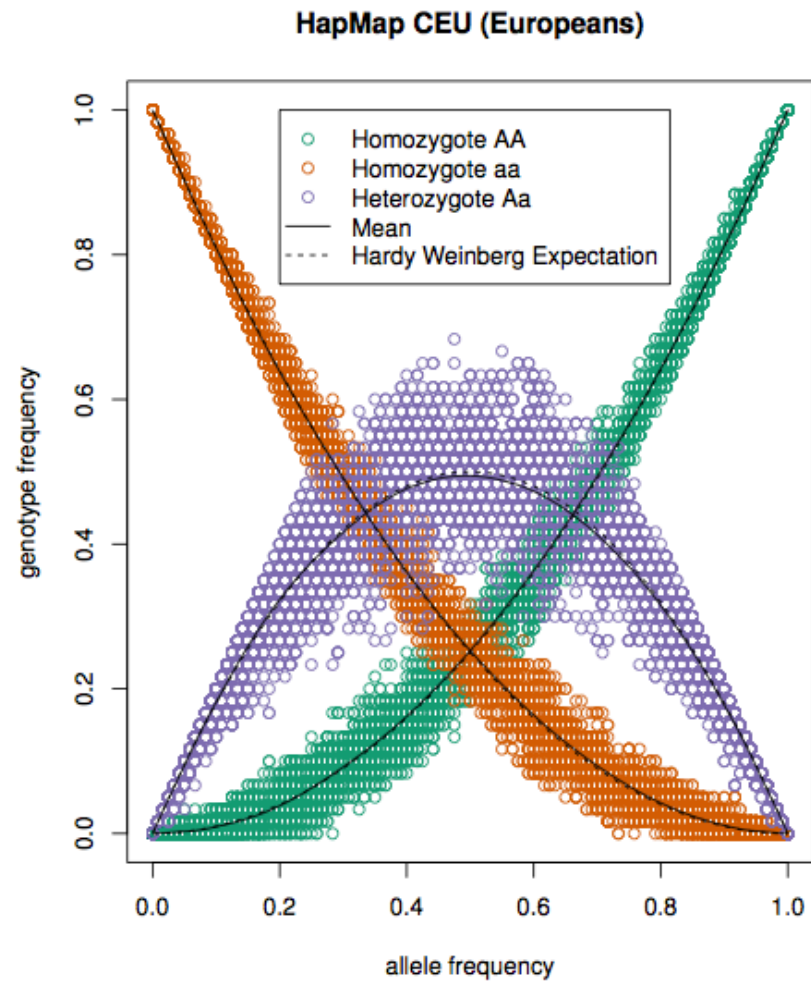
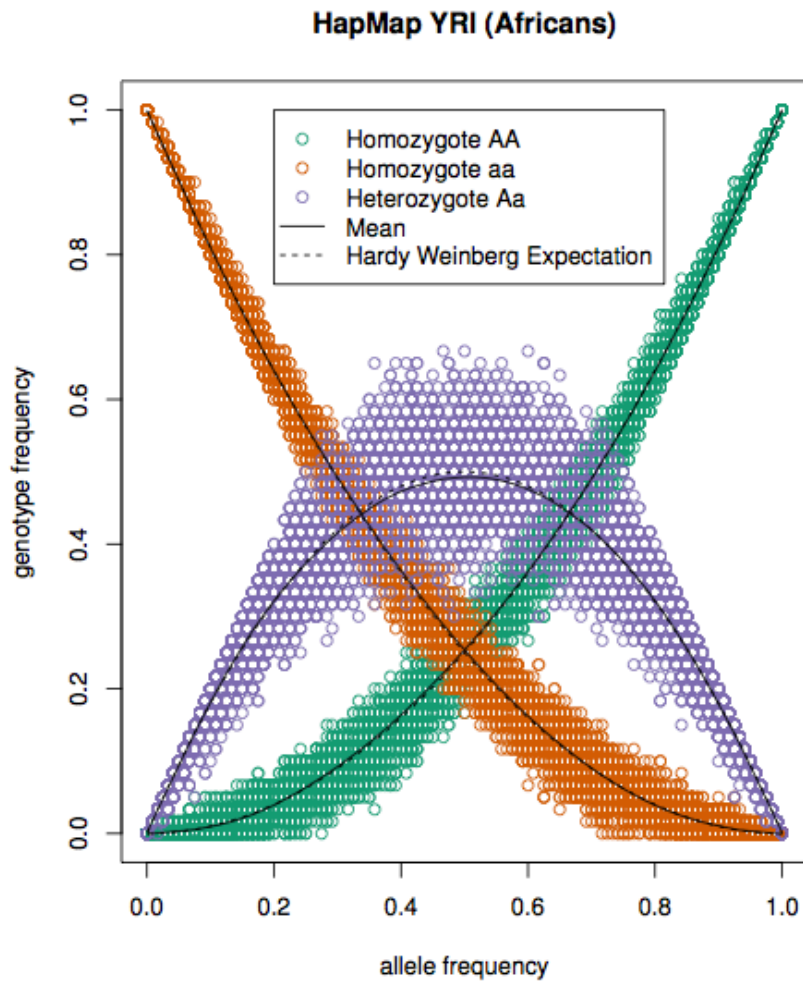
Overview

- Hardy-Weinberg equilibrium
- Inbreeding & RGD
- Human origins

Hardy-Weinberg



Hardy-Weinberg



Random genetic drift

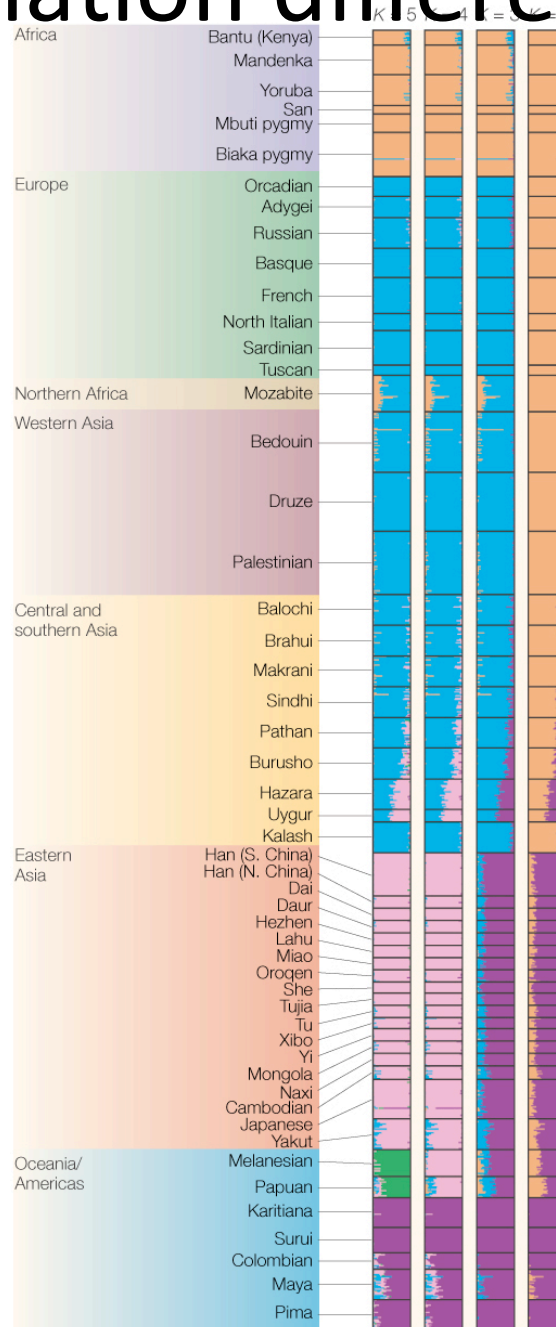
- Founder effects
 - Ashkenazi Jews

Condition	Carrier Frequency
Tay-Sachs	1/30
Canavan disease	1/40
Cystic fibrosis	1/29
Familial dysautonomia	1/32
Bloom syndrome	1/100
Fanconi anemia group C	1/89
Gaucher disease	1/15
Mucopolysaccharidosis type IV	1/127
Niemann-Pick disease	1/90
Glycogen storage 1a	1/71
Maple syrup urine disease	1/81

Random genetic drift

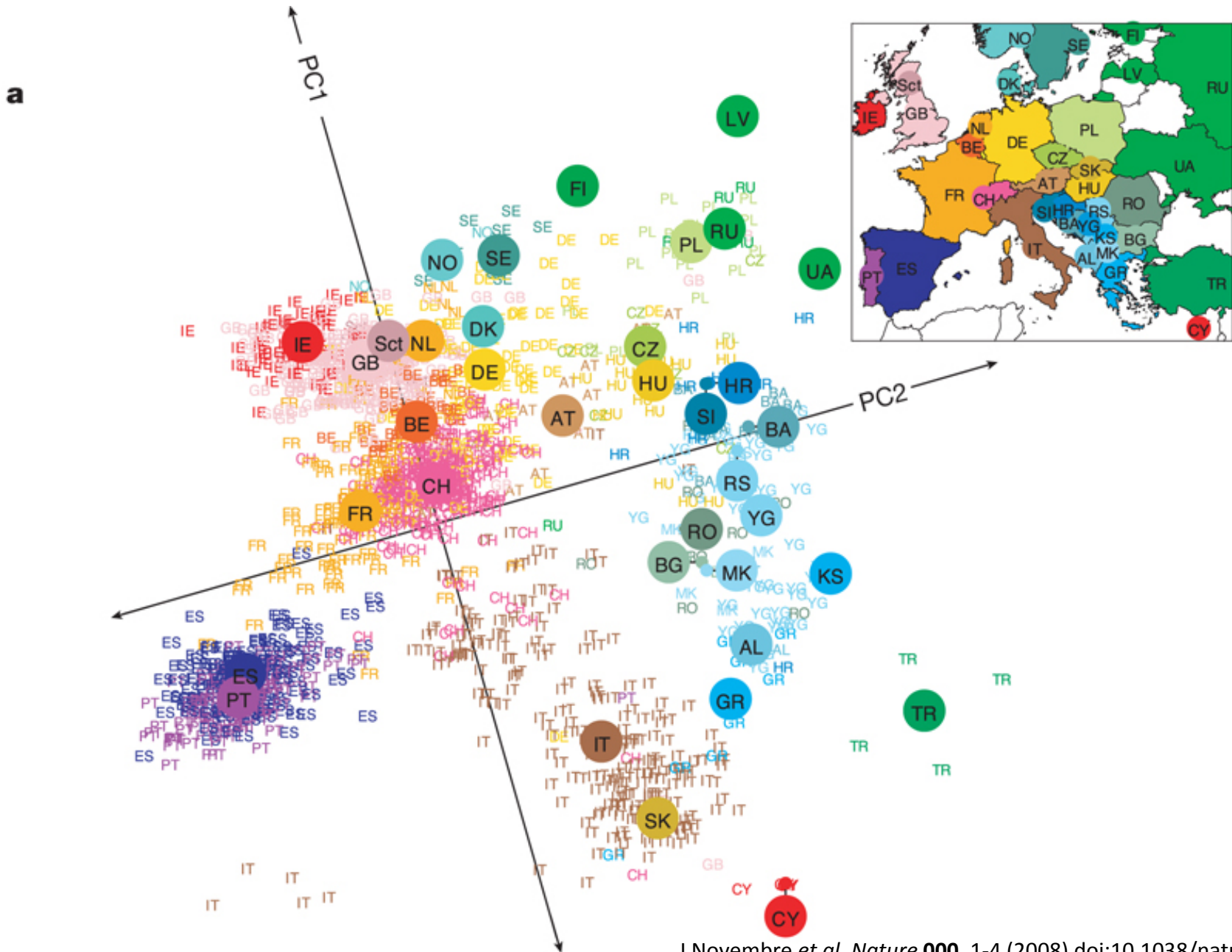
- Founder effects
 - Ashkenazi Jews
 - Amish
 - Hutterite
 - Afrikaner population
- Morphometric traits
 - Cranial evolution

Population differentiation

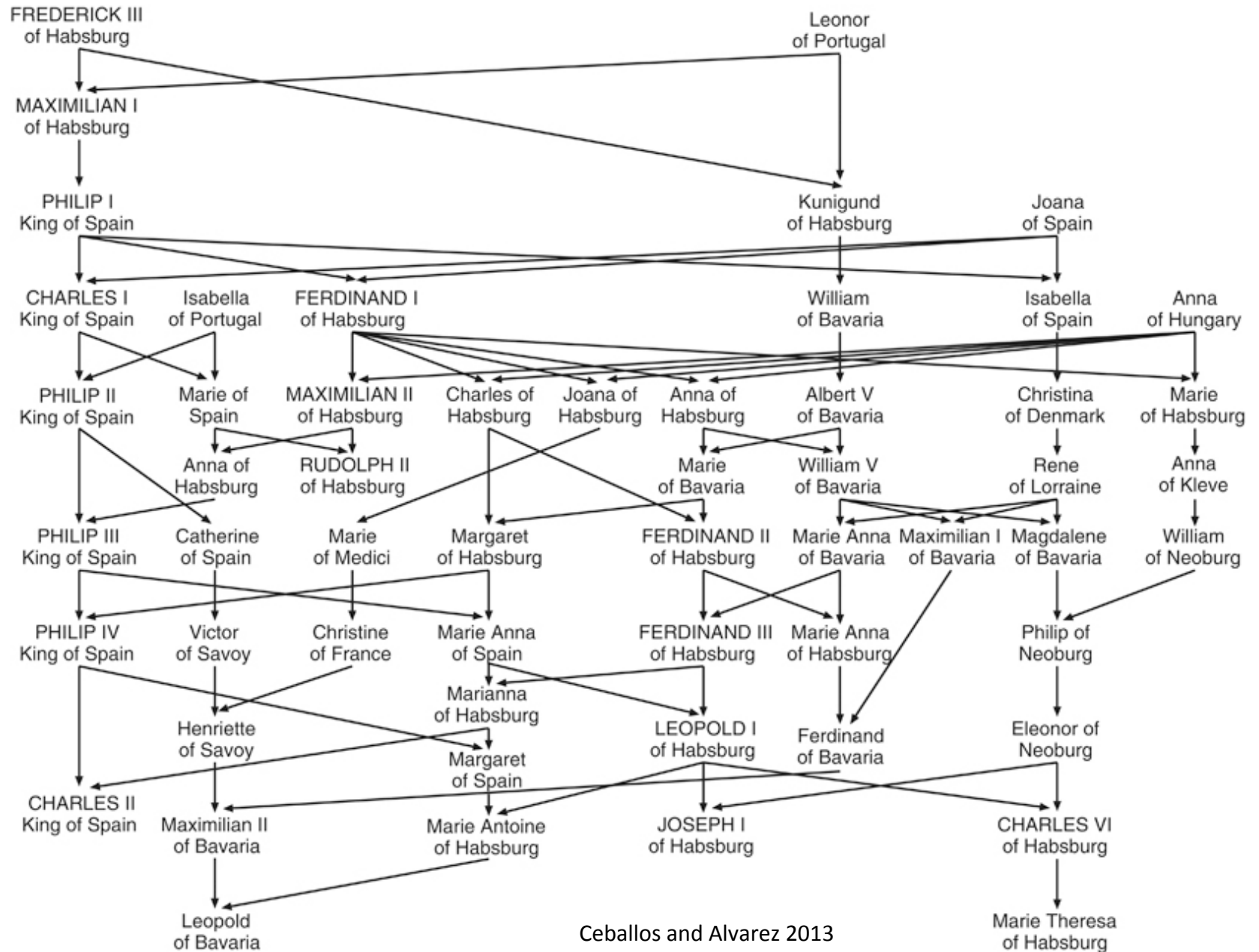


Cavalli-Sforza 2005
Rosenberg et al. 2002

Population differentiation

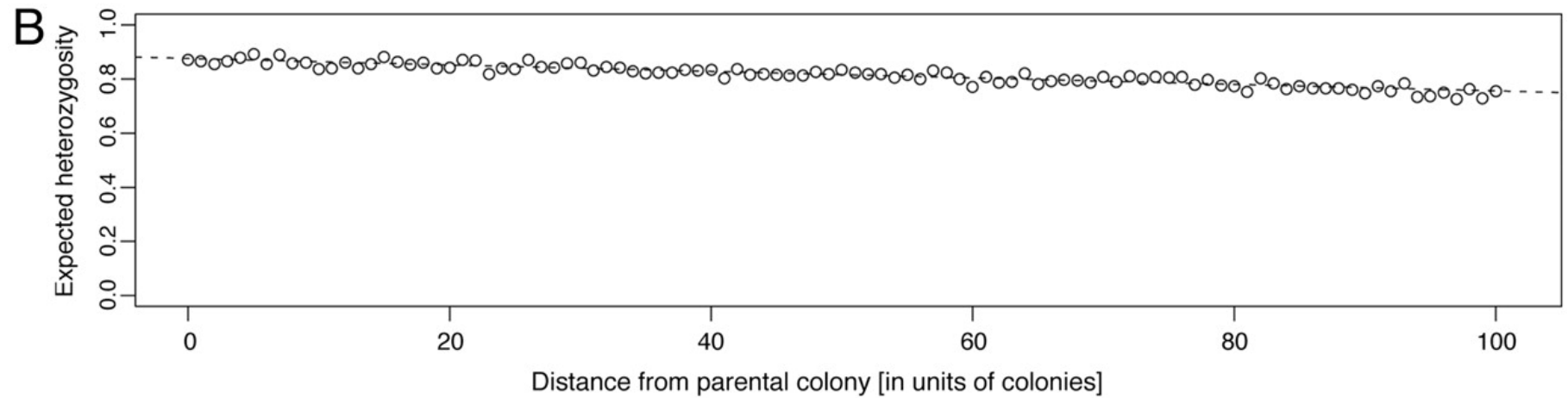
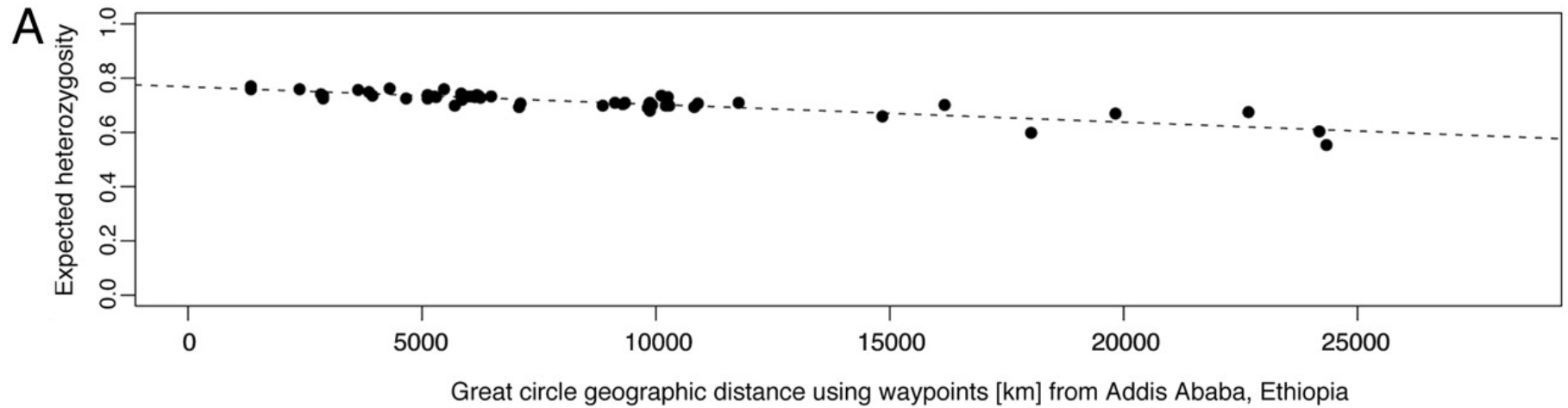


Inbreeding

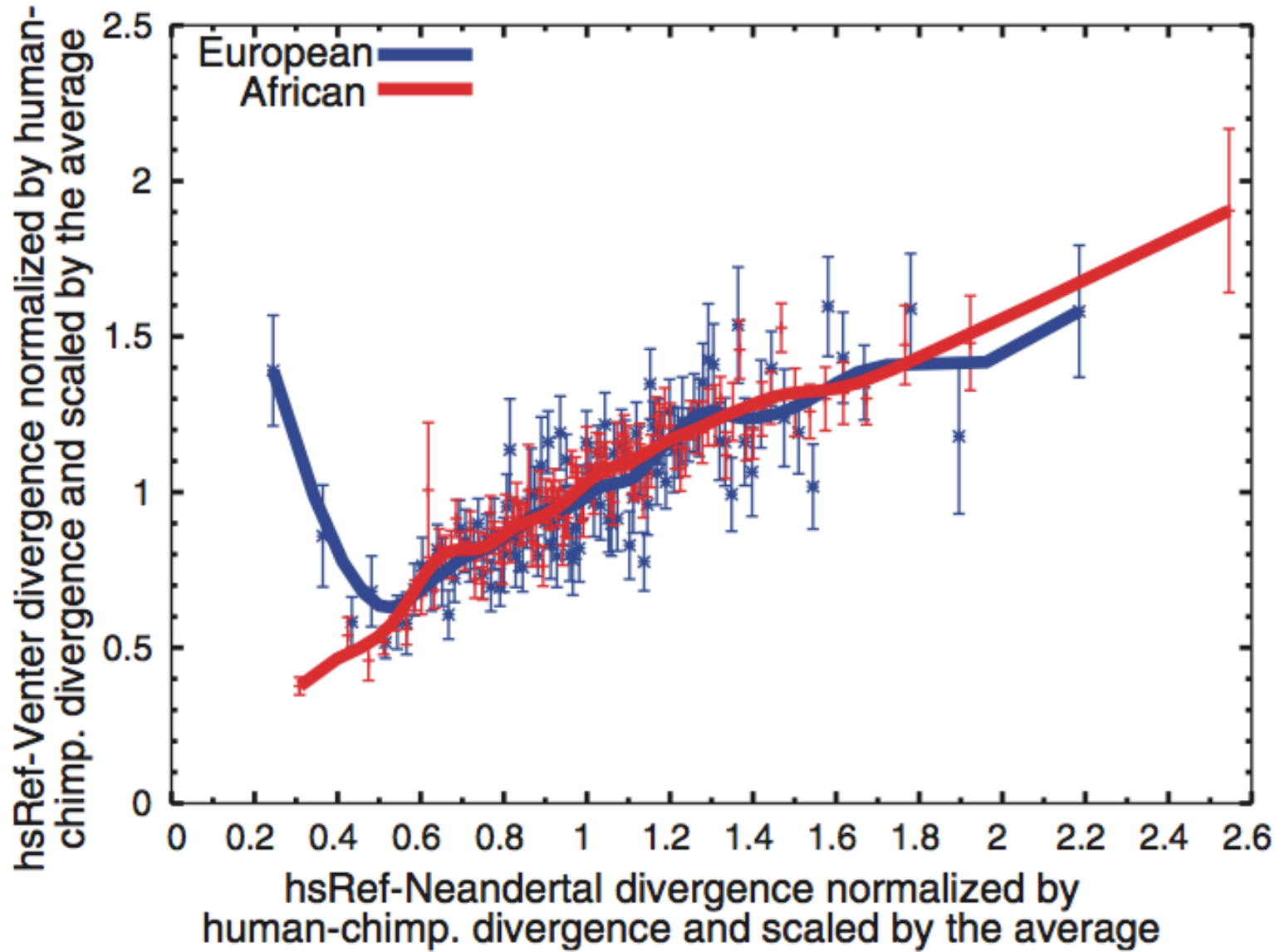


Human origins

Human origins



Human origins



Human origins

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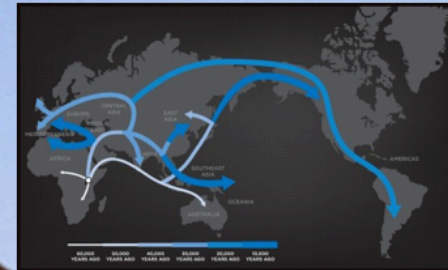
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The Human Story

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Since its launch in 2005, National Geographic's Genographic Project has used advanced DNA analysis and worked with indigenous communities to help answer fundamental questions about where humans originated and how we came to populate the Earth. Now, cutting-edge technology is enabling us to shine a powerful *new* light on our collective past. By participating in the latest phase of this real-time scientific project, you can learn more about yourself than you ever thought possible. You will also help support the Genographic Legacy Fund, which works to conserve and revitalize indigenous cultures around the world.



The Genographic Project: Q&A with Dr. Miguel Vilar

Learn more about the Genographic Project's Ten-Year History and Current Directions in an Interview with Anthropologist and Project Manager, Dr. Miguel Vilar

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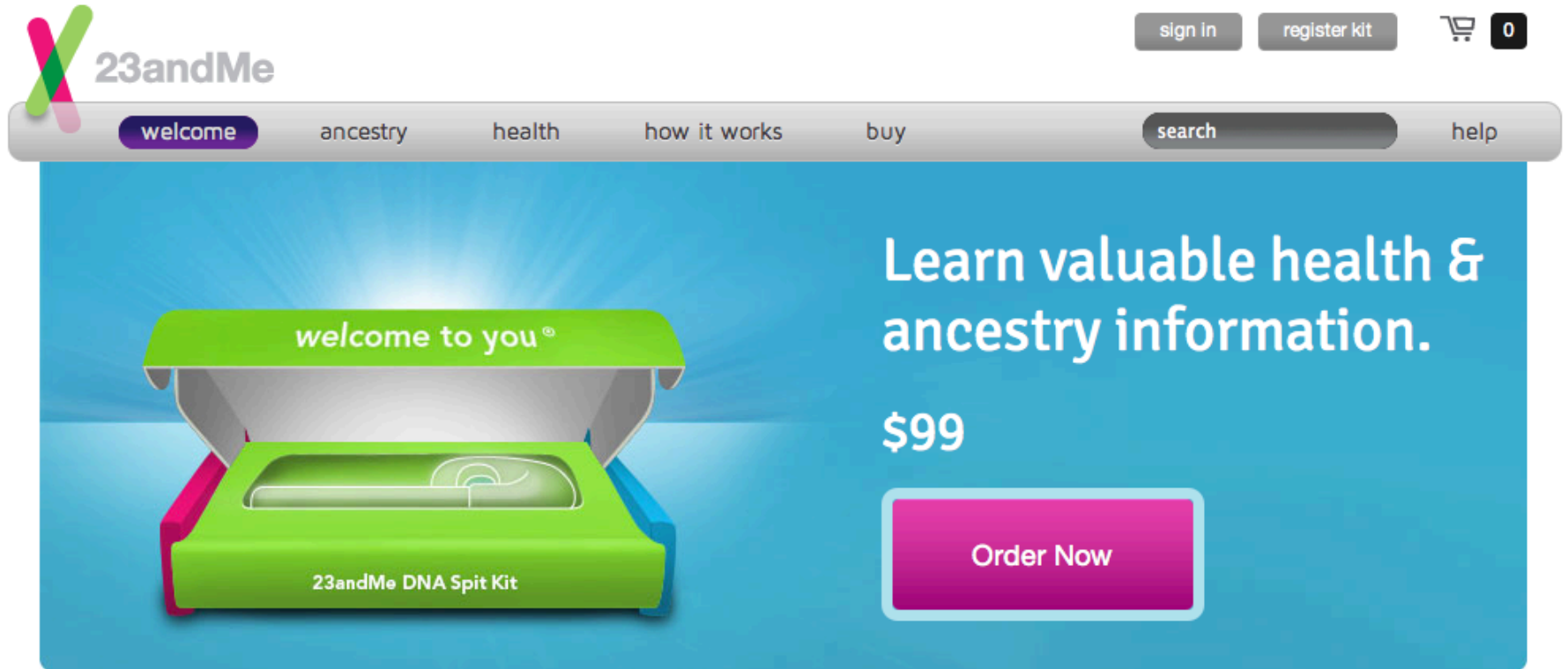
742,652

PARTICIPANTS
IN THE
GENOGRAPHIC
PROJECT

IN OVER 140
COUNTRIES



Human origins



The image shows a screenshot of the 23andMe website. At the top left is the 23andMe logo, which consists of a stylized 'X' made of three overlapping lines in pink, green, and blue, followed by the text '23andMe'. To the right of the logo are navigation links: 'welcome' (highlighted in a purple box), 'ancestry', 'health', 'how it works', 'buy', 'search' (in a dark grey box), and 'help'. Further right are buttons for 'sign in', 'register kit', and a shopping cart icon with a '0' next to it. The main content area has a blue background. On the left is a 3D rendering of an open green DNA Spit Kit box. The inside of the lid says 'welcome to you®' and the bottom of the box says '23andMe DNA Spit Kit'. On the right, white text reads 'Learn valuable health & ancestry information.' Below this is the price '\$99' and a large purple button with the text 'Order Now'.

23andMe

sign in register kit 0

welcome ancestry health how it works buy search help

welcome to you®

23andMe DNA Spit Kit

Learn valuable health & ancestry information.

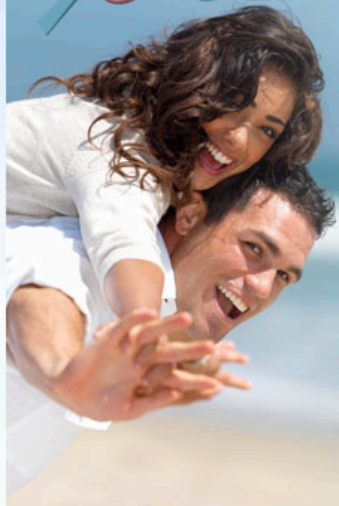
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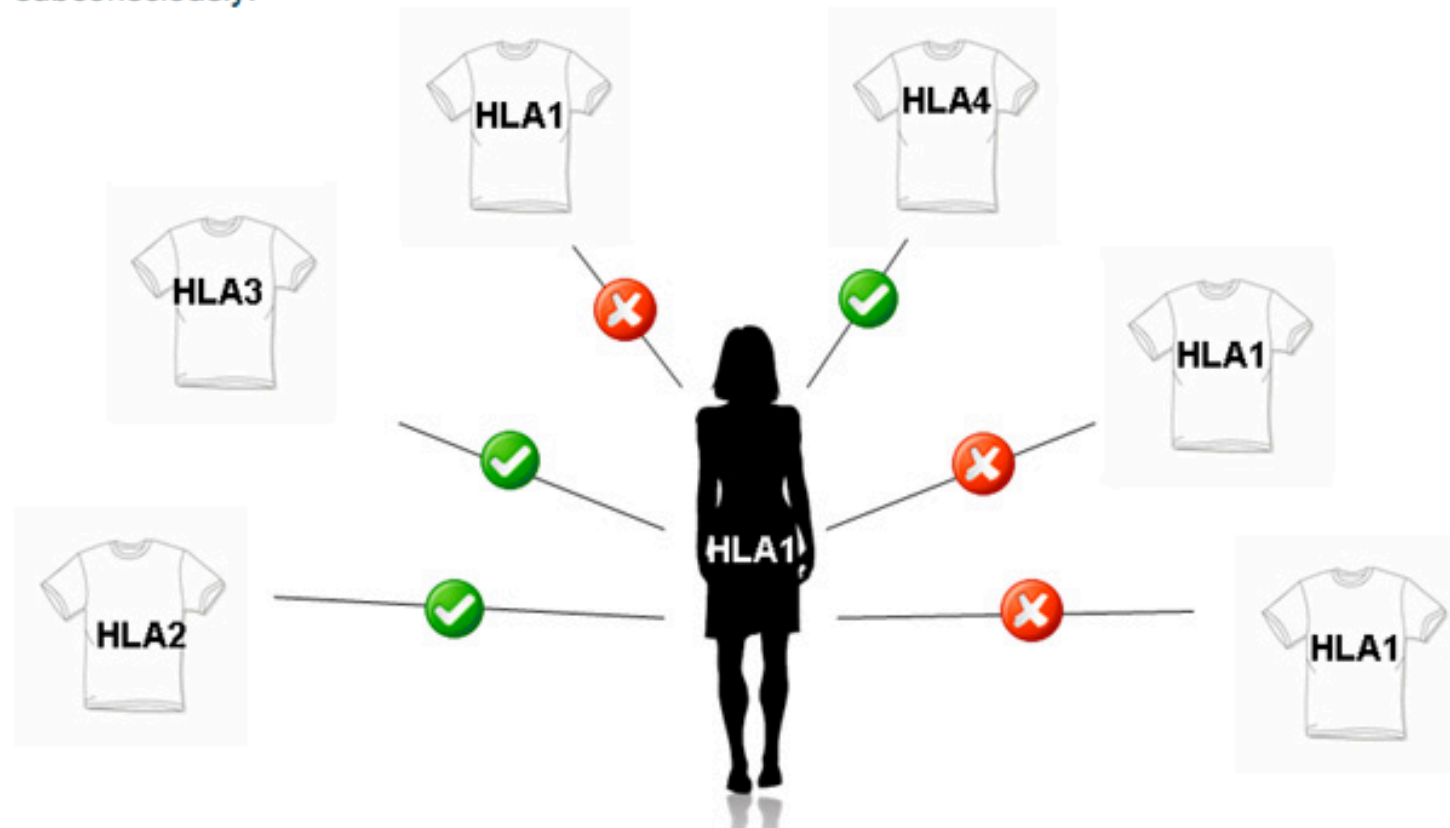
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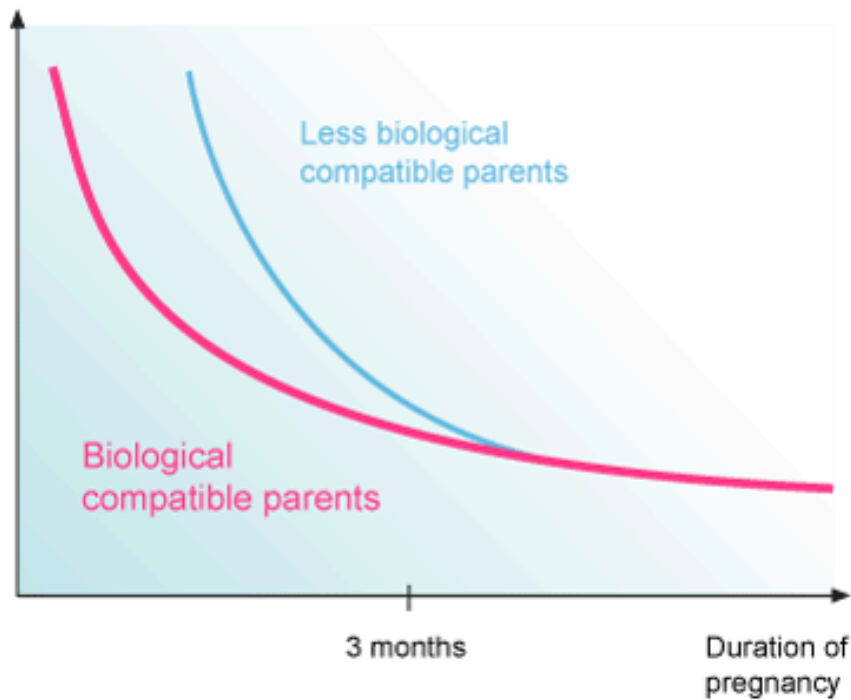
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The Science behind Genepartner

Inspiration

The GenePartner project was inspired by a famous study performed by Prof. Dr. Wedekind at the University of Bern in Switzerland. In this study, Prof. Dr. Wedekind recruited female volunteers to smell T-shirts worn by men for three consecutive days and rate them for attractiveness. He then analyzed the particular part of DNA that codes for HLA (human leukocyte antigen) molecules and found that women preferred T-shirts from men whose HLA molecules were most different from their own. Sensing and classifying the HLA genes is something our bodies do automatically and subconsciously.





prevent potential inbreeding.

HLA genes and the immune system

HLA molecules play a central role in controlling the activation of immunological effectors during an immune response and are therefore essential for immune resistance. A greater variety in HLA genes offers a greater variety in possible immune responses. In terms of evolution, this makes perfect sense: children of couples with a higher variety in their HLA genes (and hence, immune responses) will have better protection from a greater variety of diseases. Simply put, this means that their body has more weapons to use in its defence against a disease. An important additional effect is that comparing HLA genes can help identify kinship and

The GenePartner formula

In 2003, the GenePartner team decided to take this discovery one step further and see if there are specific patterns of HLA genes that "attract" each other more. In collaboration with the [Swiss Institute for Behavioural Genetics](#), we tested a large number of individuals (both romantically involved couples and persons not in a relationship) for their HLA genes. The results were astounding and led to the development of a formula that combines the diversity factor studied by Prof. Dr. Wedekind, together with several other evolutionary factors researched and developed by the Swiss Institute for Behavioral Genetics.

The GenePartner formula measures the genetic compatibility between two individuals and makes an accurate prediction of the strength of their basis for a long-lasting and fulfilling romantic relationship.

Genetic compatibility

High diversity in specific immune system components ensures greater resistance against a variety of diseases. Our bodies automatically sense how diverse the immune systems of people around us are, and we subconsciously classify them depending on how genetically compatible they are to our own.

With genetically highly compatible people we feel that rare sensation of perfect chemistry. This is the body's receptive and welcoming response when immune systems harmonise and fit together.

The effects of genetic compatibility

Genetic compatibility results in an increased likelihood of forming an enduring and successful relationship. Research has also shown that the sex lives of genetically compatible partners are more satisfying than average. Additionally, fertility rates are higher in genetically compatible couples and they have healthier children.