

Human Germline
Genetic Editing: Rapidly
Advancing but Where
and to What End?

Concepts of Health & Disease

WHO definition of Health

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946 and entered into force on 7 April 1948.

The Definition has not been amended since 1948



<http://harriellottuncg.wordpress.com/tag/laron-syndrome/>

Growth Hormone Receptor Deficiency Is Associated with a Major Reduction in Pro-Aging Signaling, Cancer, and Diabetes in Humans

Jaime Guevara-Aguirre, et al.

Sci Transl Med 16 February 2011

We monitored for 22 years Ecuadorian individuals who carry mutations in the growth hormone receptor (GHR) gene that lead to severe GHR and IGF-1 (insulin-like growth factor–1) deficiencies The individuals with GHR deficiency exhibited only one nonlethal malignancy and no cases of diabetes.

J Clin Endocrinol Metab. 2015 Jul; 100(7): 2589–2596.

GH Receptor Deficiency in Ecuadorian Adults Is Associated With Obesity and Enhanced Insulin Sensitivity

Jaime Guevara-Aguirre, Arlan L. Rosenbloom,
Priya Balasubramanian, Enrique Teran, Marco
Guevara-Aguirre, Carolina Guevara, Patricio Procel,
Irene Alfaras, Rafael De Cabo, Stefano Di Biase,
Luis Narvaez, Jannette Saavedra, and Valter D.
Longo

In summary, subjects with GHRD do not develop diabetes because they lack the counter-regulatory effect of GH....

This critical role for GH action in the induction of insulin resistance is an important consideration in the frequent administration of pharmacological doses of recombinant human GH (rhGH) for growth promotion in children who do not have GH deficiency. A large postmarketing surveillance study noted a 6-fold increase in the development of T2D with rhGH therapy, which did not resolve when rhGH treatment was stopped.

Good Genomic Medicine?

- Should we treat children of idiopathic short stature?
- “Until there are more strong studies on the psychological benefits of receiving growth hormone and the long-term safety of treatment (including years after discontinuing treatment), parents will need to make the decision without the benefit of reliable research.”

(<http://labblog.uofmhealth.org/rounds/should-growth-hormone-be-used-for-short-stature-kids>)

Delineating Genomic Good Health

- What is healthy and who decides?!
- Deafness – disease or different culture?
- Down Syndrome and RNA therapy?
- Redheads (MC1R mutants)?!



(http://www.nationalacademies.org/gene-editing/2nd_summit/index.htm)

On Human Genome Editing II

Statement by the Organizing Committee of the Second International Summit on Human Genome Editing

November 29, 2018

Even if the modifications are verified, the procedure was irresponsible and failed to conform with international norms. The organizing committee calls for an ongoing international forum to foster broad public dialogue, develop strategies for increasing equitable access to meet the *needs of underserved populations*....

Faith Organizations Gather in Rome to Discuss Ways to Fight Antimicrobial Resistance

December 15, 2016

Georgetown co-sponsors a four-day workshop with the U.S. Embassy to the Holy See and the U.S. Department of State that examines ways faith-based organizations might address the global health threat of antimicrobial resistance.

<https://www.georgetown.edu/news/faith-organizations-gather-in-rome-to-discuss-ways-to-fight-antimicrobial-resistance/>

GOOD Genomic Healthcare

- Discussion of the goods/goals of gene editing medicine requires input from all who might benefit, especially the underserved and marginalized.
- Technological advance will be slowed, but healthcare will be more effective and humane. Which goal do we want—better technology or better healthcare?!