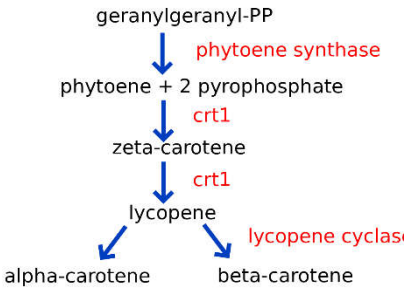
THE GOLDEN RICE

https://en.wikipedia.org/wiki/Golden_rice

What is Golden Rice?

Golden rice was developed to solve a big problem mostly in Asia or other places where there is a shortage of vitamin A. It is a type of rice that is genetically engineered. The difference between the white rice and the golden rice is the amount of vitamin A that is produced by the addition of three beta-carotene biosynthesis genes. There is also golden Rice 2 that is still in development now. It was announced in 2004 and this new type of golden rice produce 23 times more beta-carotene than the original golden rice did. Golden rice 2 is a combination of maize and rice. They use the phytoene synthase gene of the maize and the crt1 from the original golden rice. The phytoene synthase of the maize is important because it catalyzes the conversion of an important reaction to produce proteins.



https://commons.wikimedia.org/wiki/File:Carotenoidsynthesis.svg

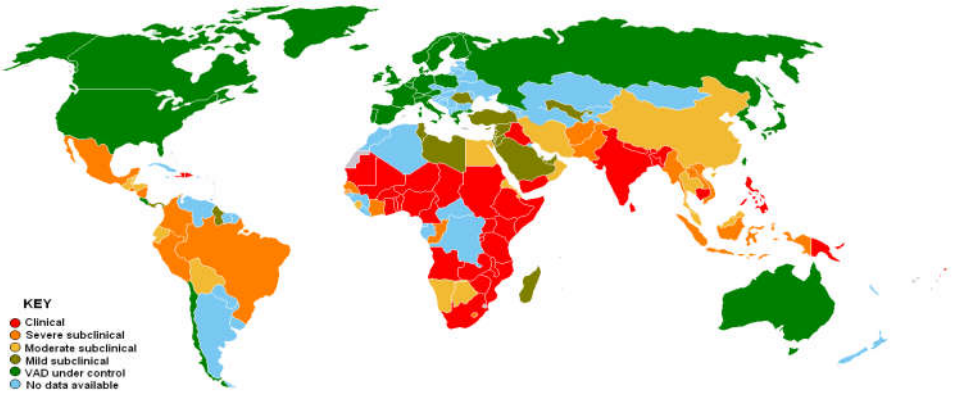
Why is Golden rice so important?

The development of the Golden rice is to decrease the deficiency of Vitamin A. This vitamin is very important for children. When you don ´t have enough Vitamin A in your younger years you could be

diagnosed with blindness, Xerophthalmia (your eyes can't produces tears that can lead to blindness) and even to death.

In 2005 there were 190 million children and 19 million pregnant woman diagnosed with VAD (Vitamin A deficiency). Each year millions of children and pregnant women die or become blind. Children who has a lack of Vitamin A in their diet are at a high risk for Xerophthalmia, the most common cause of childhood blindness. Also a lack of vitamin A can infect children way easier, and they can die of these common infections like flue or fever.

https://www.flickr.com/photos/communityeyehealth/5636914713

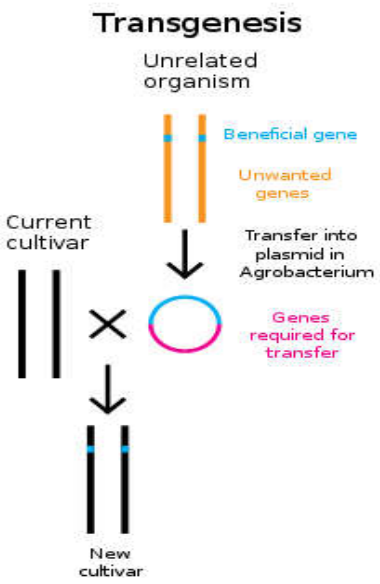


https://en.wikipedia.org/wiki/Golden_rice

**this map shows the degree of Vitamin A deficiency around the world*

How is the rice modified?

To produce and store beta-carotene the rice is genetically engineered with 3 genes. These included two genes from the daffodil plant (just a yellow flower) and the third from a bacterium (Erwinia Uredovora). This three will produce the vitamin A. These genes, along with promoters, are inserted into plasmids, small pieces of DNA. Plasmids are located in an agrobacteria (a plant microbe) that scientists use to ferry in the genes into the plant cells. They add the agrobacteria into a petri dish which contains rice embryos. When agrobacteria infect the embryos they also transfer the genes that encode the instruction for making beta-carotene. This transgenic rice needs to be crossed with local rice so it can be adapted to the local climate conditions.



https://commons.wikimedia.org/wiki/File:Breeding_transgenesis_cisgenesis.svg

History of the rice

https://www.psychologytoday.com/blog/how-risky-is-it-really/201403/challenging-advocates-when-their-values-would-do-us-harm

https://www.theglobeandmail.com/opinion/by-opposing-golden-rice-greenpeace-defies-its-own-values-and-harms-children/article14742332/

https://en.wikipedia.org/wiki/Golden_rice#Vitamin_A_deficiency

http://www.goldenrice.org/index.php