O que escondem as plantas?

NOVAS TÉCNICAS GENÓMICAS

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ANSEME

CAP AGRICULTORES DE PORTUGAL

CiB

FRUIT FUNCTIONAL GENOMICS & BIOTECHNOLOGY

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Decisão de 2018 do Tribunal de Justiça da União Europeia de que os organismos editados geneticamente se devem enquadrar, em princípio, na diretiva de OGM da UE.

ALLEA Provides Expert Advice to the European Commission's Public Consultation on Plants Produced by New Genomic Techniques

22. June 2022 /

In its response, ALLEA stresses that the 2018 European Court of Justice decision *"is a major setback for the development of useful new crops, including those with optimised traits to mitigate climate change and provide high-quality food for a growing population. The length and cost of the current authorisation process for NGTs is disproportional to the potential risks and makes it, except for major industrial players, de facto impossible to bring NGT seeds to our farmers".*

Em abril de 2021, a Comissão Europeia publicou um estudo sobre novas técnicas genómicas (NGTs), com o objetivo de esclarecer a posição da UE sobre a tecnologia à luz da decisão de 2018:

“o enquadramento jurídico atual que rege as NGTs é insuficiente para se poder usufruir dos benefícios dessa tecnologia";

"os produtos NGT têm o potencial de contribuir para sistemas agroalimentares sustentáveis, de acordo com os objetivos do Acordo Verde Europeu e da Estratégia Farm to Fork".

EU consultation confirms that Europeans support policy change on Novel Genomic Techniques

September 22, 2022

European seed sector - Plant breeding innovation

The just published results of a European Commission public consultation on the "Legislation for plants produced by certain new genomic techniques (NGTs)" show that almost 80% of the 2200 participants do regard the existing provisions of the GMO legislation as inadequate for plants obtained by latest breeding methods such as targeted mutagenesis or cisgenesis. Applications of targeted mutagenesis are highly versatile and can be used in the development of a wide range of different plant products while the existing EU rules largely date back to the 1990s and are based on the scientific knowledge of that time.

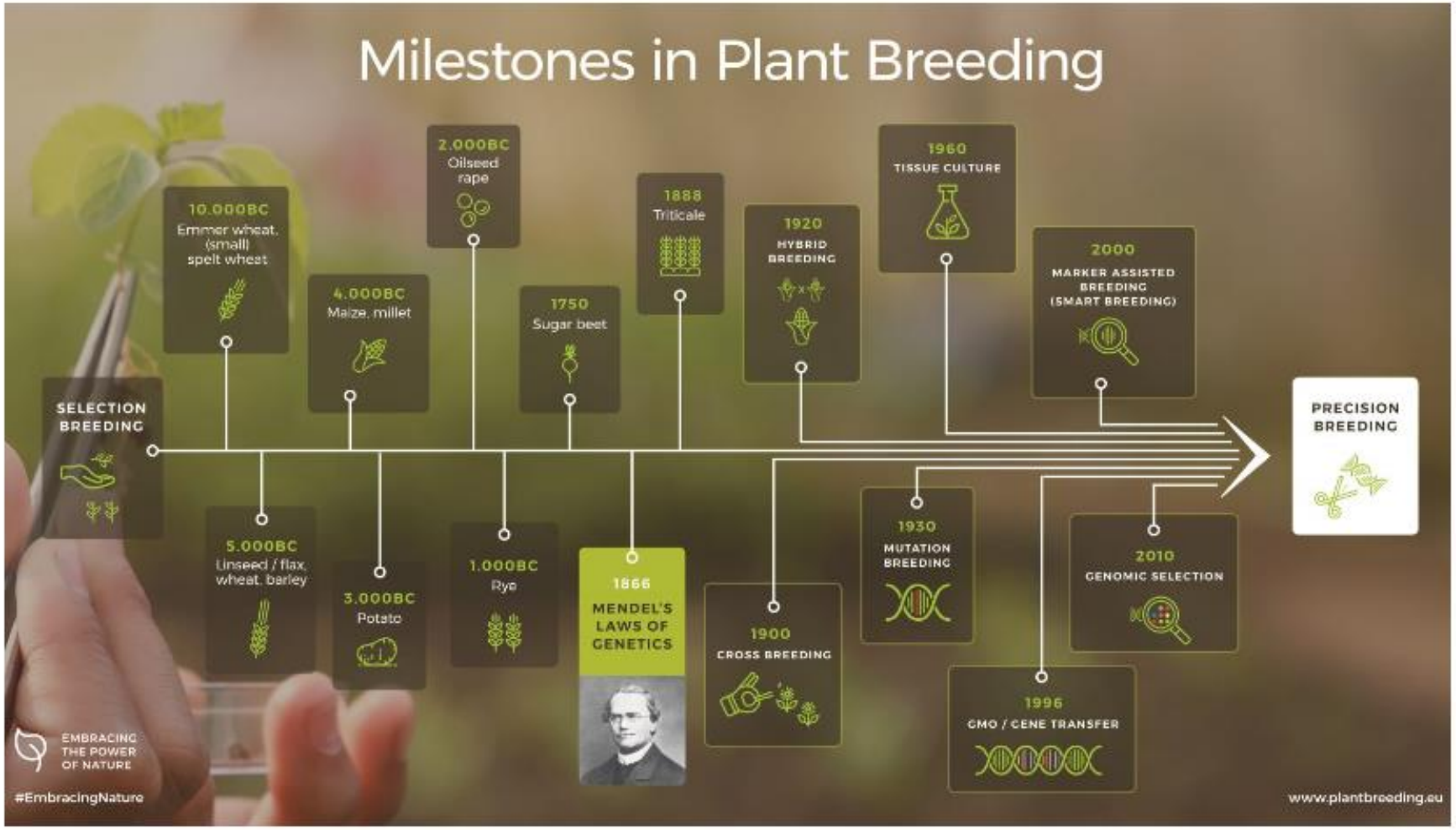
- **As variedades de plantas desenvolvidas através de NGTs não devem estar sujeitas às regulamentações de OGMs se também puderem ser obtidas através de métodos de *breeding* anteriores ou se resultarem de processos espontâneos na natureza.**

- **NGTs que resultem em plantas semelhantes às obtidas por melhoramento convencional não se conseguem distinguir destas e, portanto, apresentam os mesmos riscos.**

Autoridade Europeia para a Segurança Alimentar (EFSA):

- **As variedades obtidas por meio de novas técnicas genómicas têm essencialmente o mesmo perfil de risco que as variedades de plantas produzidas por melhoramento convencional.**

- **A vantagem das NGTs: as alterações são feitas de forma controlada, direcionada e mais precisa. Portanto, podemos avaliar melhor essas alterações e quaisquer riscos.**



Genetic variation is the "Fuel" of Plant Breeding

By Maura Maxwell | 10 January 2023

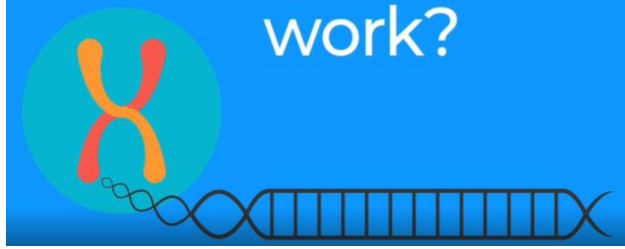
New study shows taste, appearance and pesticide levels are more important considerations than whether grapes were bred using gene editing

New research led by Washington State University shows US consumers care more about taste than gene editing when it comes to selecting table grapes.

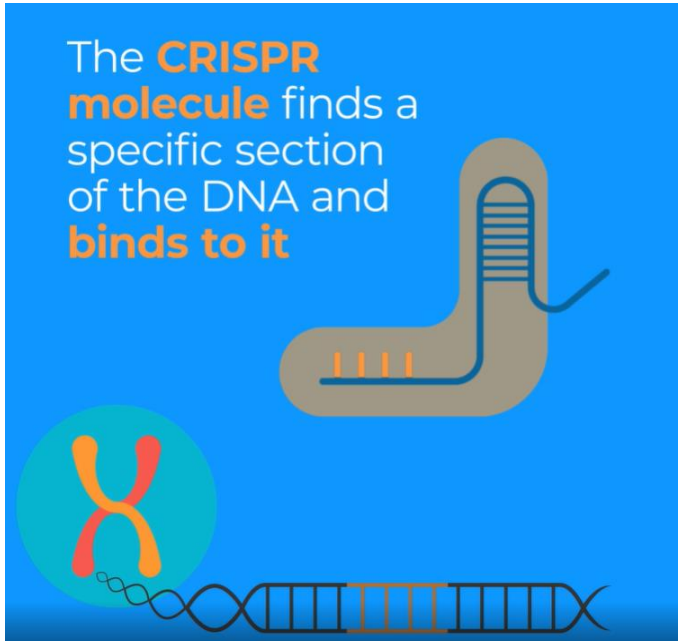
The study, published in the journal PLOS One, surveyed more than 2,800 people across the US to see how accepting they might be of gene-edited table grapes, even though none are yet available on the market.

Most respondents cared more about the grapes' taste, followed by their

How does **CRISPR-CAS GENOME EDITING** work?



The **CRISPR molecule** finds a specific section of the DNA and **binds to it**



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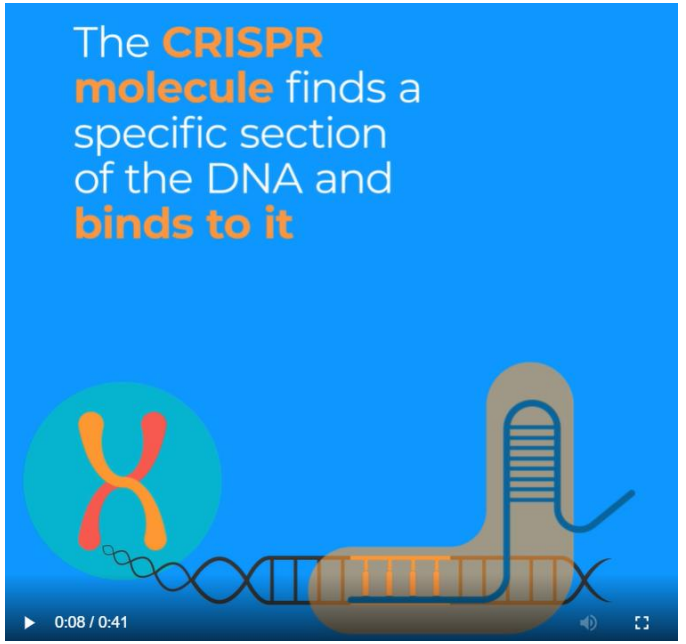
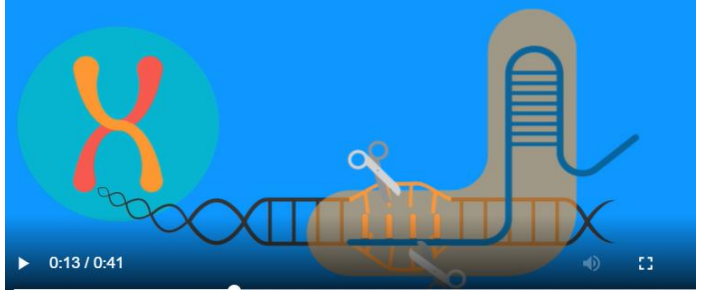
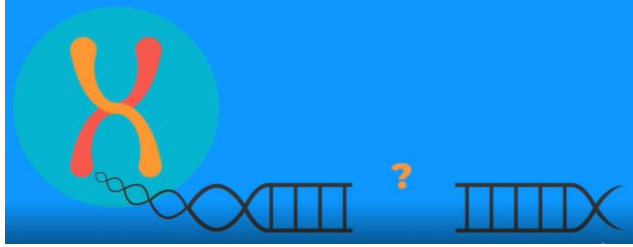


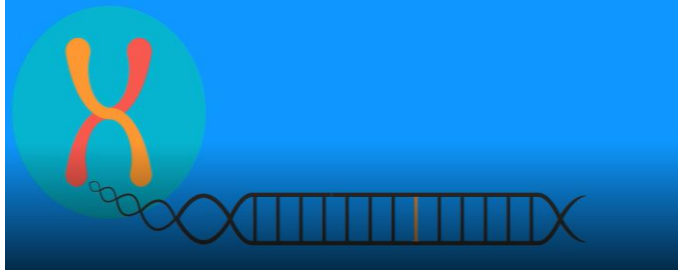
The **CAS protein** acts like **scissors** and cuts the DNA strand

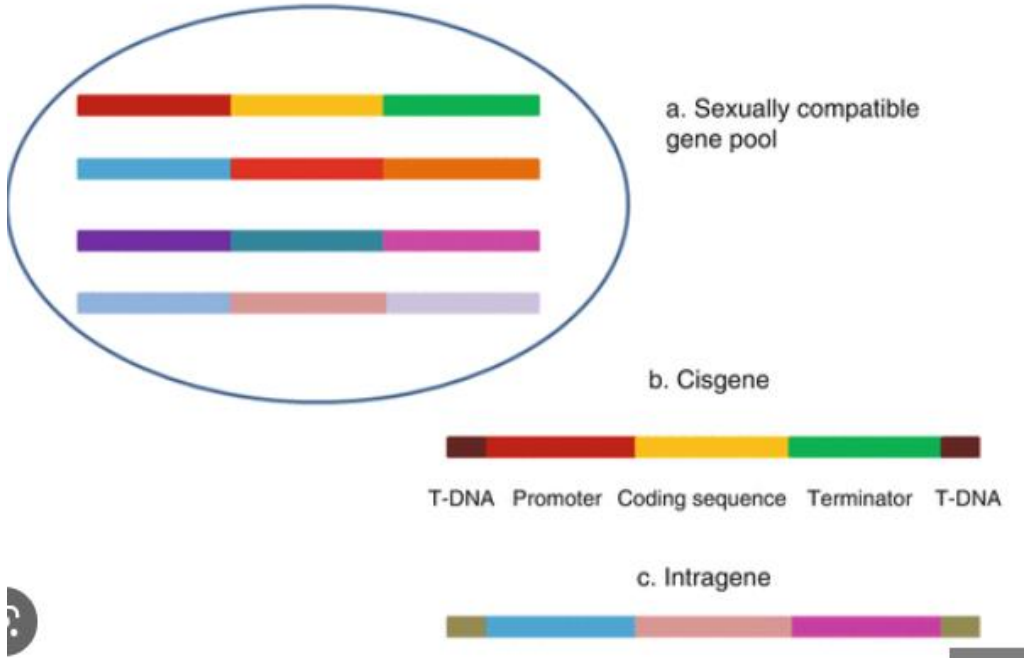


In **which ways** do cells modify the DNA when **repairing the cut?**



2 Exchange of individual DNA building blocks **(nucleotides)**

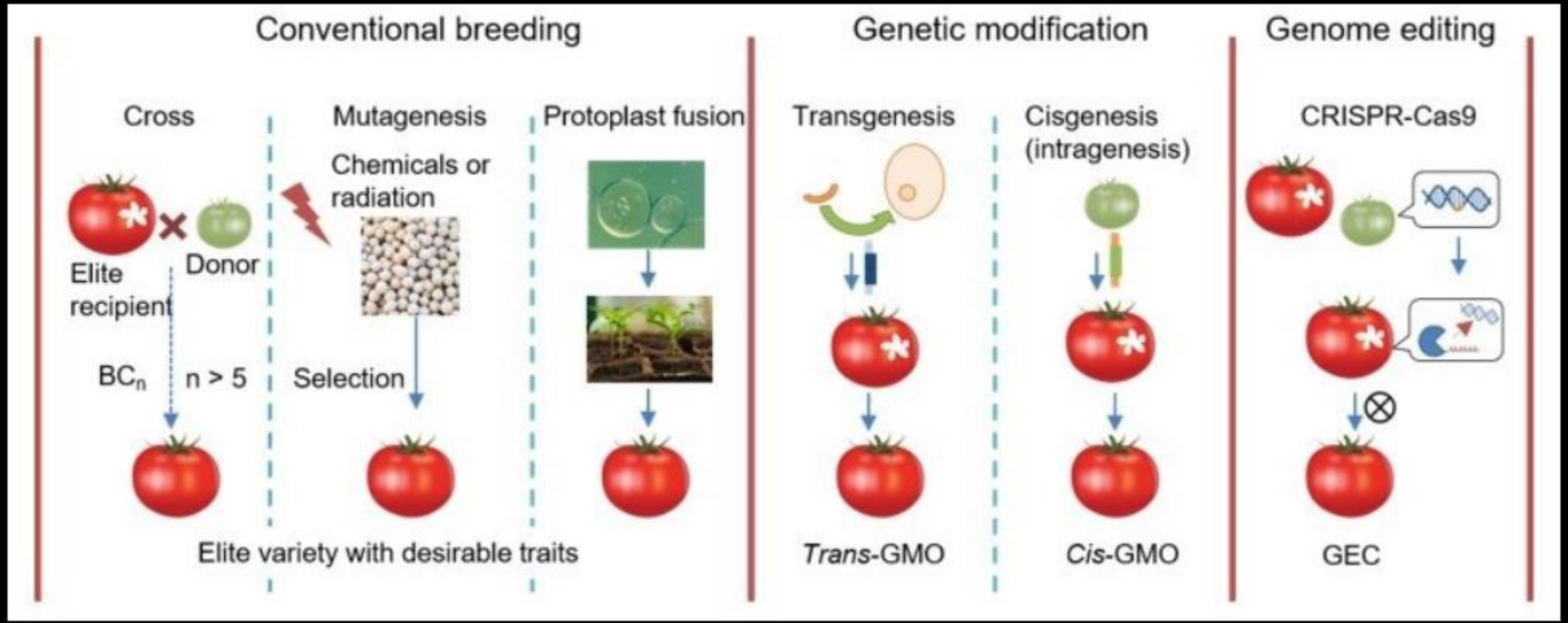




Cisgénese:

cópia completa e perfeita de um gene no seu estado natural com todos os seus elementos reguladores.

A fonte de um cisgene é a mesma espécie de planta ou uma espécie sexualmente compatível usada para melhoramento tradicional.


Conventional breeding
Genetic modification
Genome editing
Cross
Mutagenesis
Protoplast fusion
Transgenesis
Cisgenesis
(intragenesis)
CRISPR-Cas9
Chemicals or
radiation
Elite
recipient
Donor
BCn
n > 5
Selection
Elite variety with desirable traits
Trans-GMO
Cis-GMO
GEC

Vantagens e aplicações de NGTs

- **Mais alimentos (melhores rendimentos, características de qualidade)**
- **Alimentos melhores (menos pesticidas, mais nutritivos)**
- **Melhor saúde (produção mais fácil e barata de produtos biofarmacêuticos)**
- **Proteção e sustentabilidade do meio ambiente**

Rice and maize yields boosted up to 10 per cent by CRISPR gene editing

It is possible to significantly boost the yield of rice and maize using CRISPR gene editing, trials in farm fields show

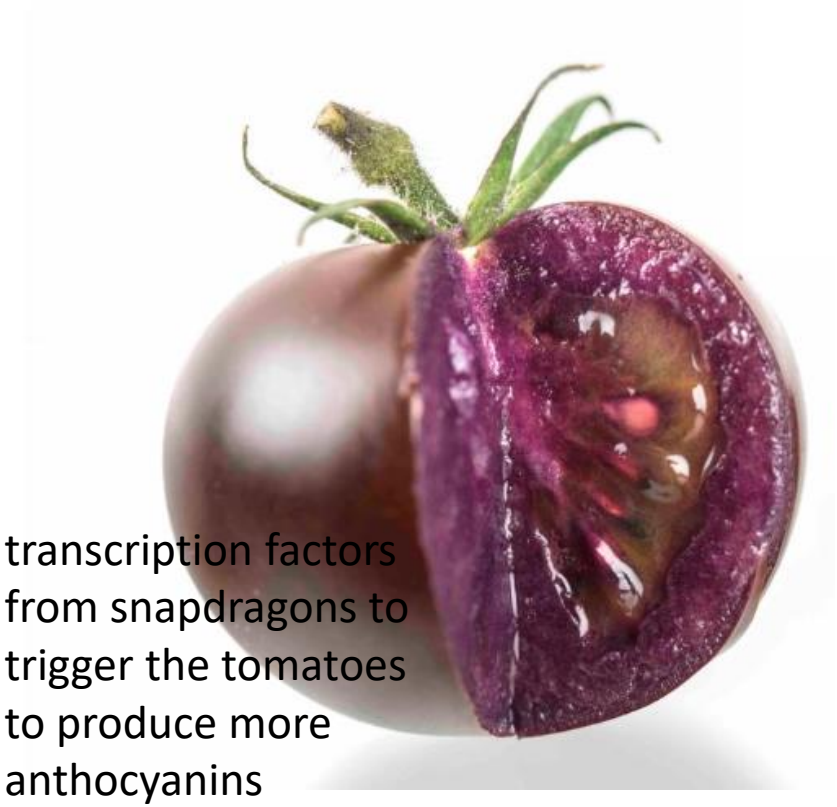
ENVIRONMENT 24 March 2022

By Chen Ly

A new, genetically modified purple tomato may hit the grocery market stands

By Zoe Sottile, CNN

Published 10:19 AM EDT, Sat September 17, 2022



transcription factors from snapdragons to trigger the tomatoes to produce more anthocyanins

Dually biofortified cisgenic tomatoes with increased flavonoids and branched-chain amino acids content

Marta Vazquez-Vilar[1], Asun Fernandez-del-Carmen[1], Victor Garcia-Carpintero[1], Margit Drapal[2], Silvia Presa[1], Dorotea Ricci[3], Gianfranco Diretto[3], José Luis Rambla[1,4], Rafael Fernandez-Muñoz[5], Ana Espinosa-Ruiz[1], Paul D. Fraser[2], Cathie Martin[6], Antonio Granell[1], Diego Orzaez[1*]

NEWS | 14 December 2021

GABA-enriched tomato is first CRISPR-edited food to enter market

Sanatech Seed's Sicilian Rouge CRISPR-edited 'health-promoting' tomatoes reach consumers and may open the market to more genome-edited fruit, vegetables and even fish.

Perdas pós-colheita

Amadurecimento do tomate

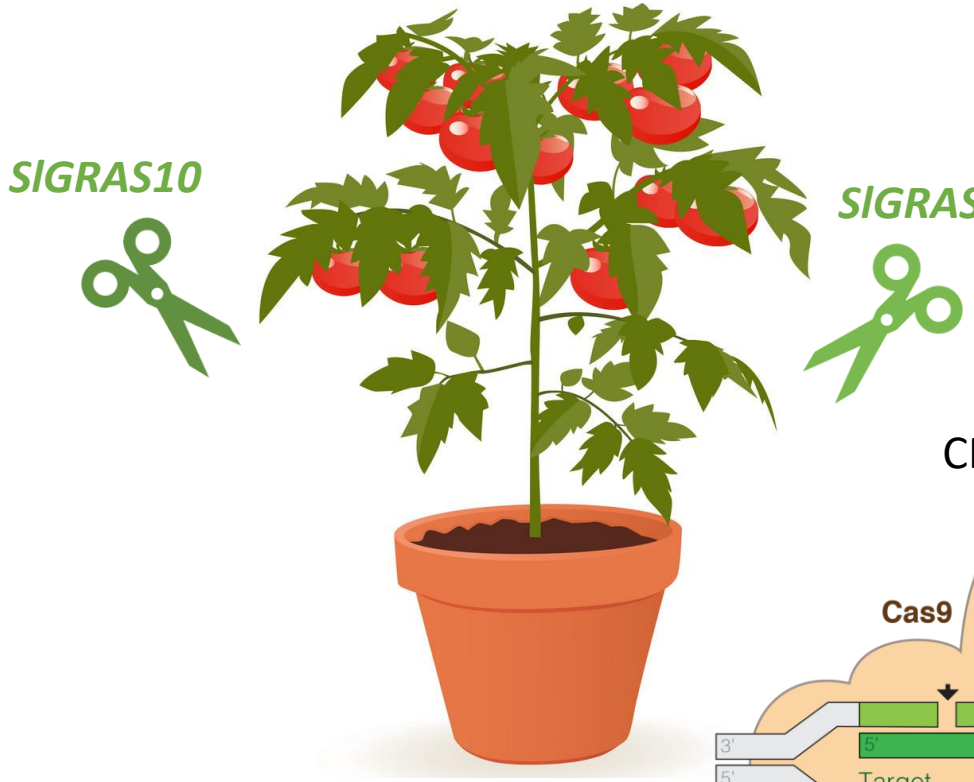
- identificar os reguladores moleculares do amadurecimento.
- **aumentar o tempo de prateleira através do controlo do amadurecimento.**

Gene editing

SlGRAS10 mutant

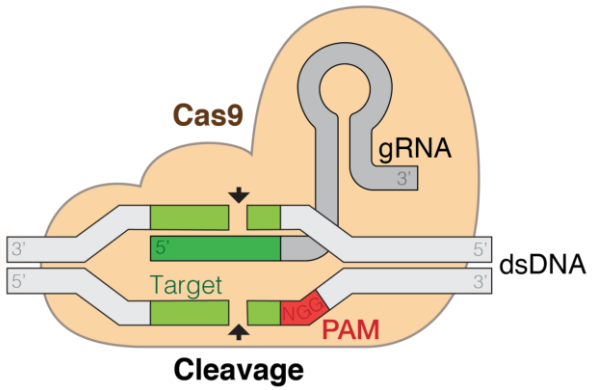
T2

SlGRAS9 e SlGRAS10 double mutants

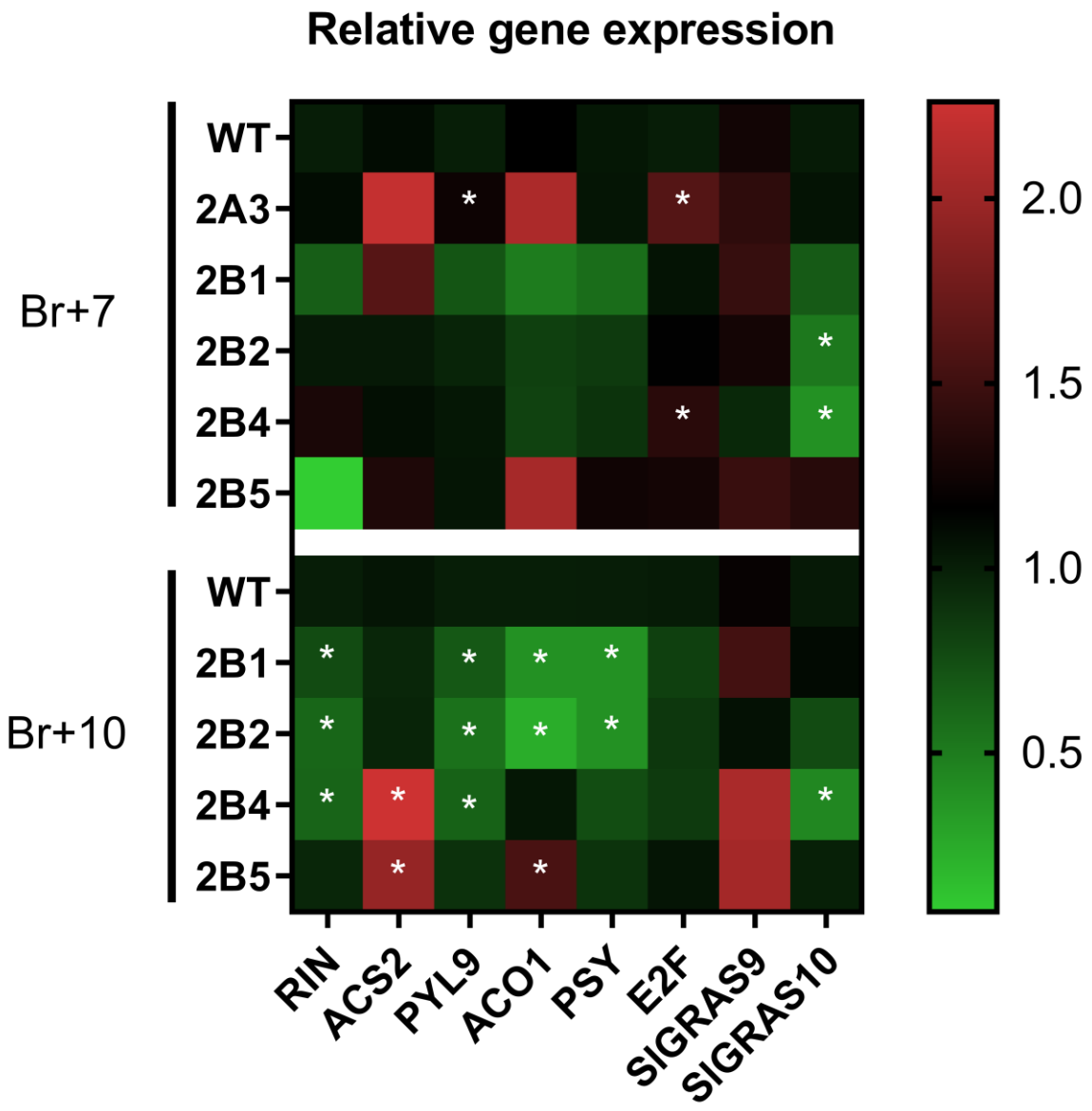


T0

CRISPR-cas9

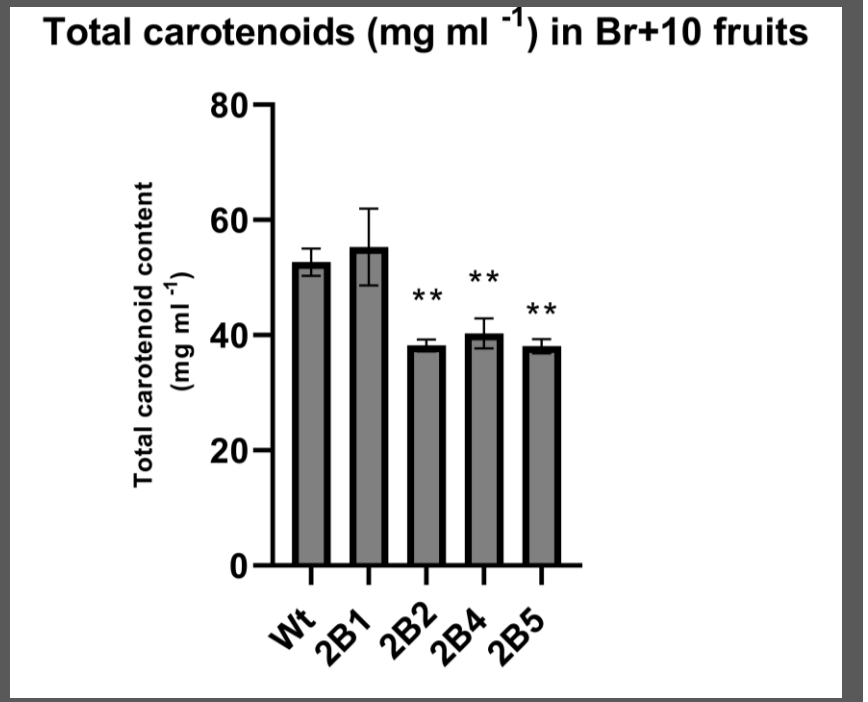


SlGRAS 10



Mutant

Wt



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