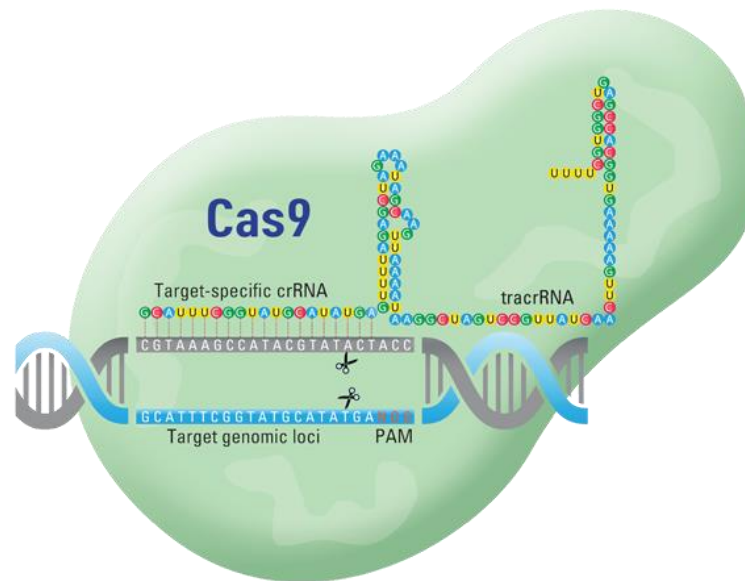


NBTs – Genetic engineering 2.0?

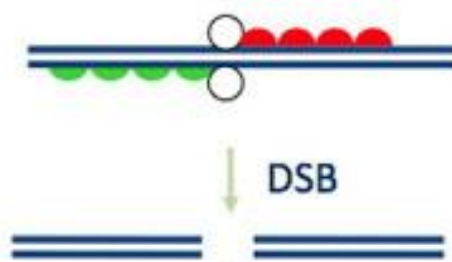
Plant breeding innovation

- Genome editing
- Cisgenesis
- Reverse breeding
- RNA-dependent DNA methylation
- Agro-infiltration
- Grafting

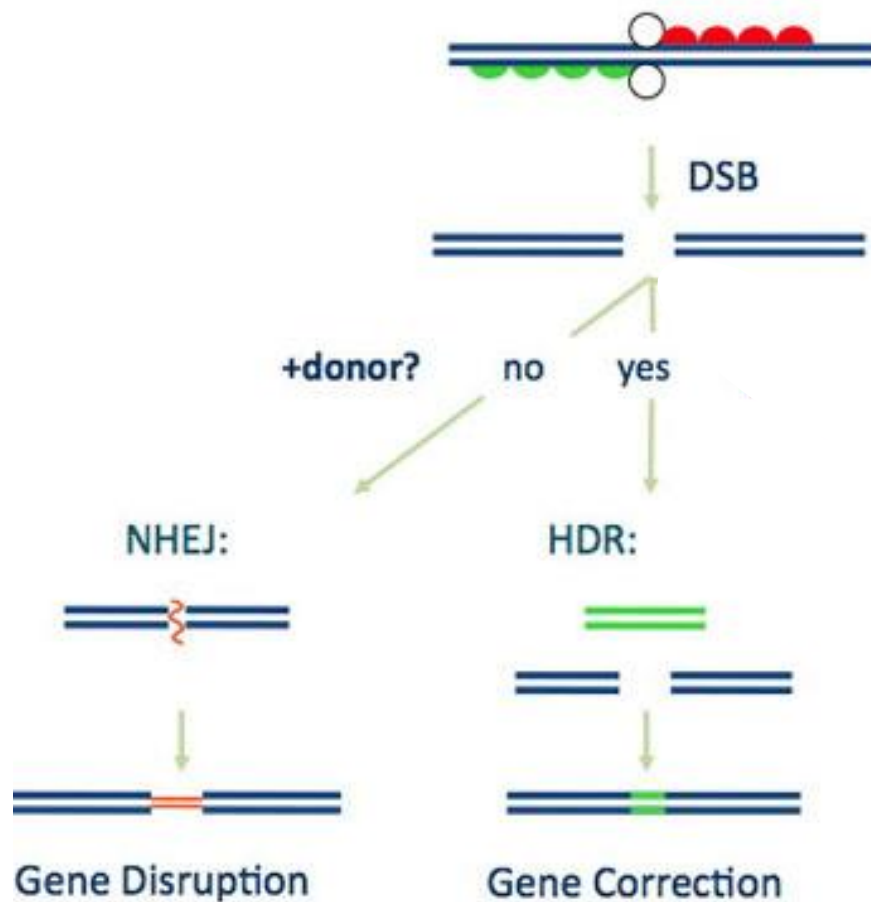
Genome editing: the CRISPR/Cas9 revolution



A double-strand break



Break repair



Genome edits

Point mutation

ACGTCCGGCATTTC -> ACGTCC**C**GCATTTC

Frameshift mutation

ACGTCCGGCATTTC -> ACGTCCT**T**GGCATTTC

Stop codon insertion

ACGTCCGGCATTTC -> ACGTCCT**TA**AGGCATTTC

Small deletion

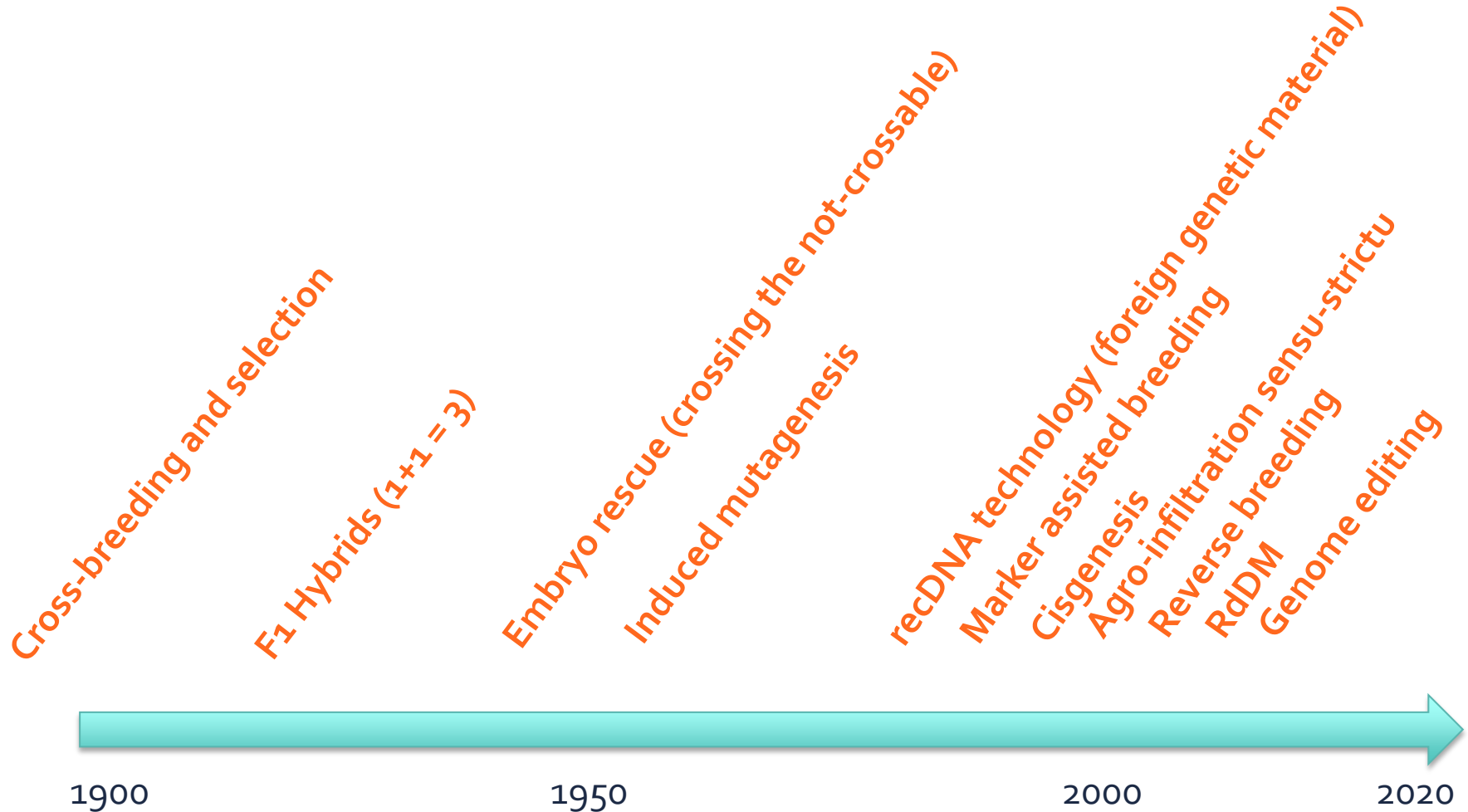
ACGTCCGGCATTTC -> ACGT**---**GCATTTC

Small insertion

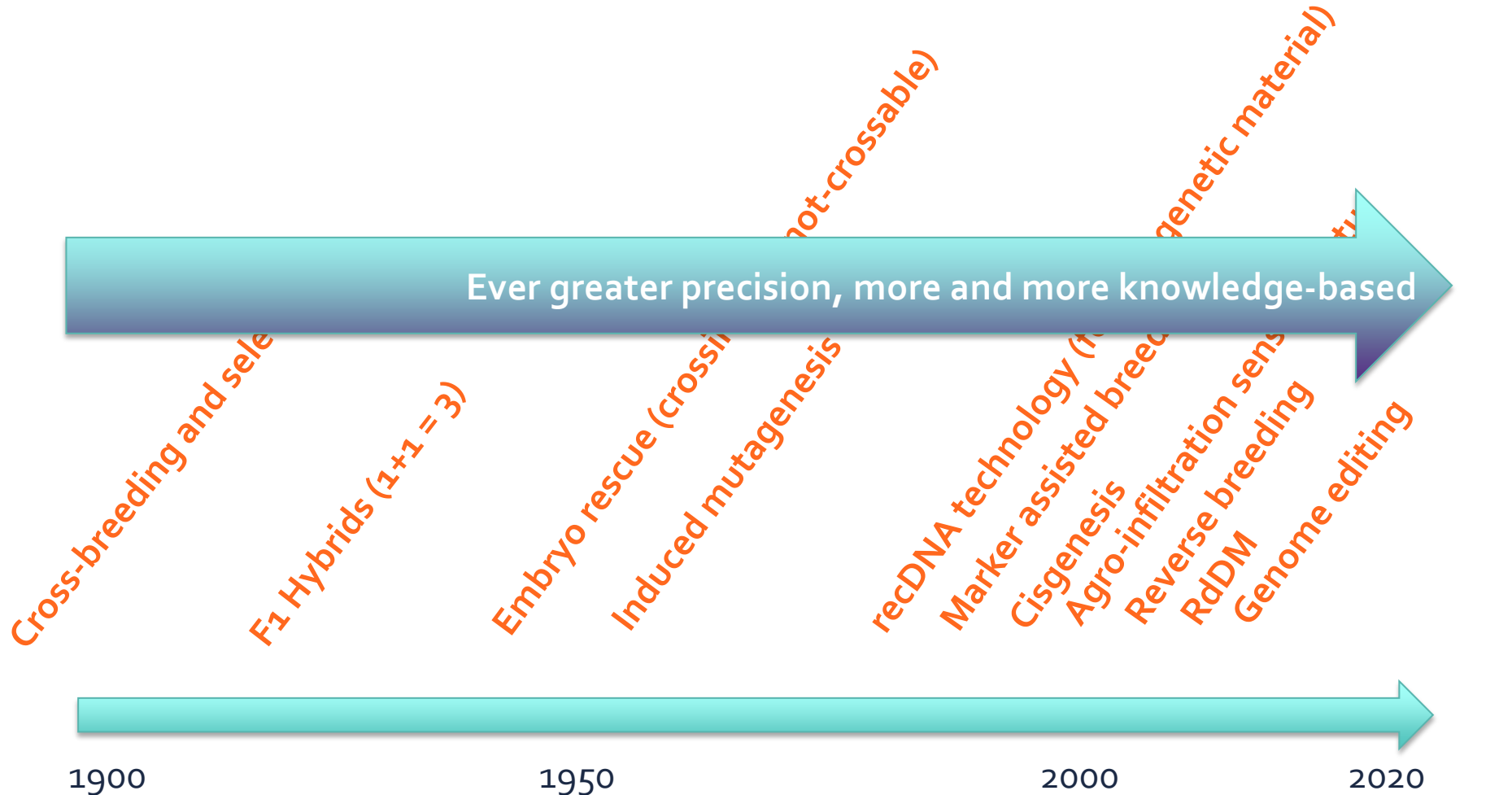
ACGTCCGGCATTTC -> ACGTCCT**TATC**GGCATTTC

Allele replacement

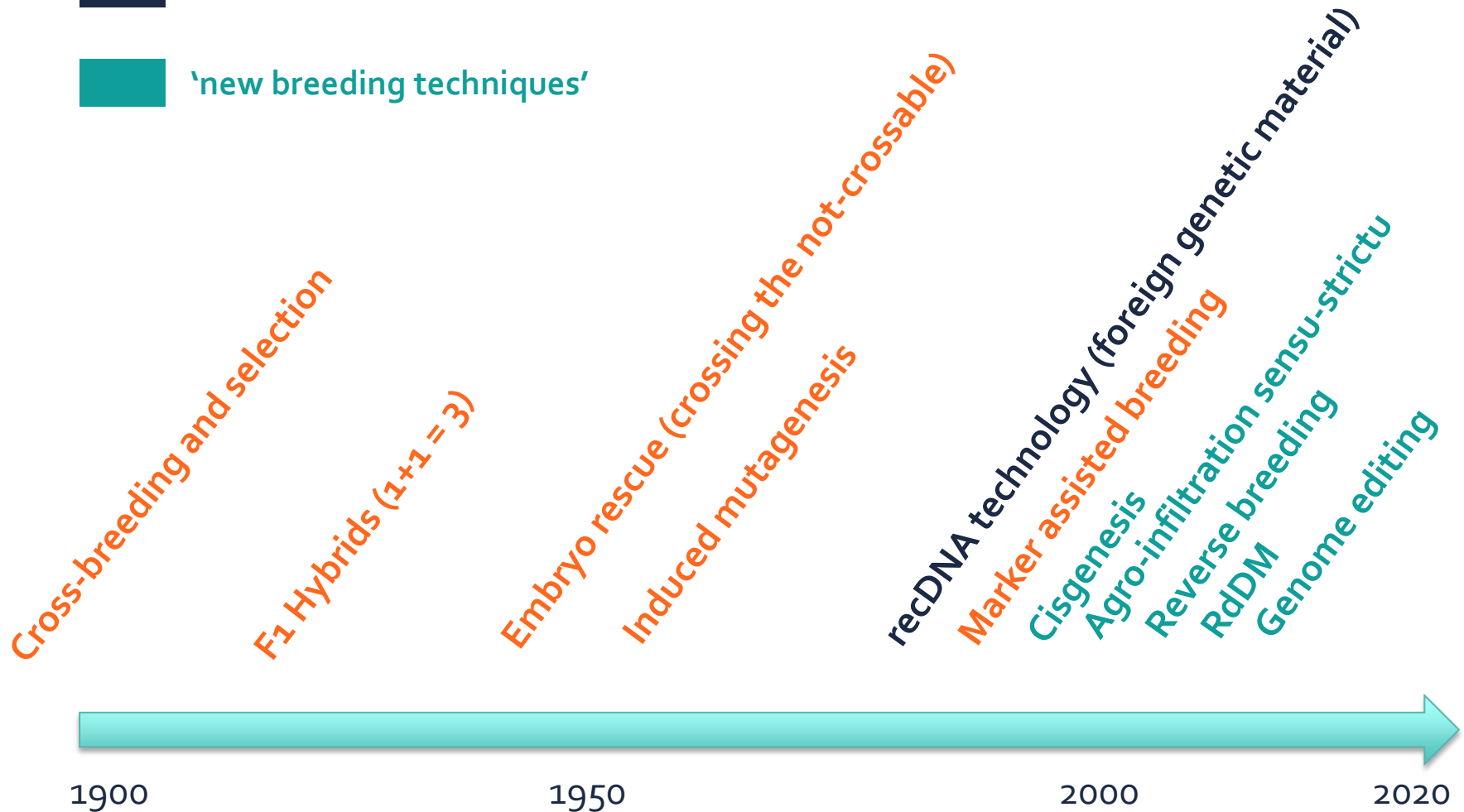
Genome editing in context of plant breeding innovation



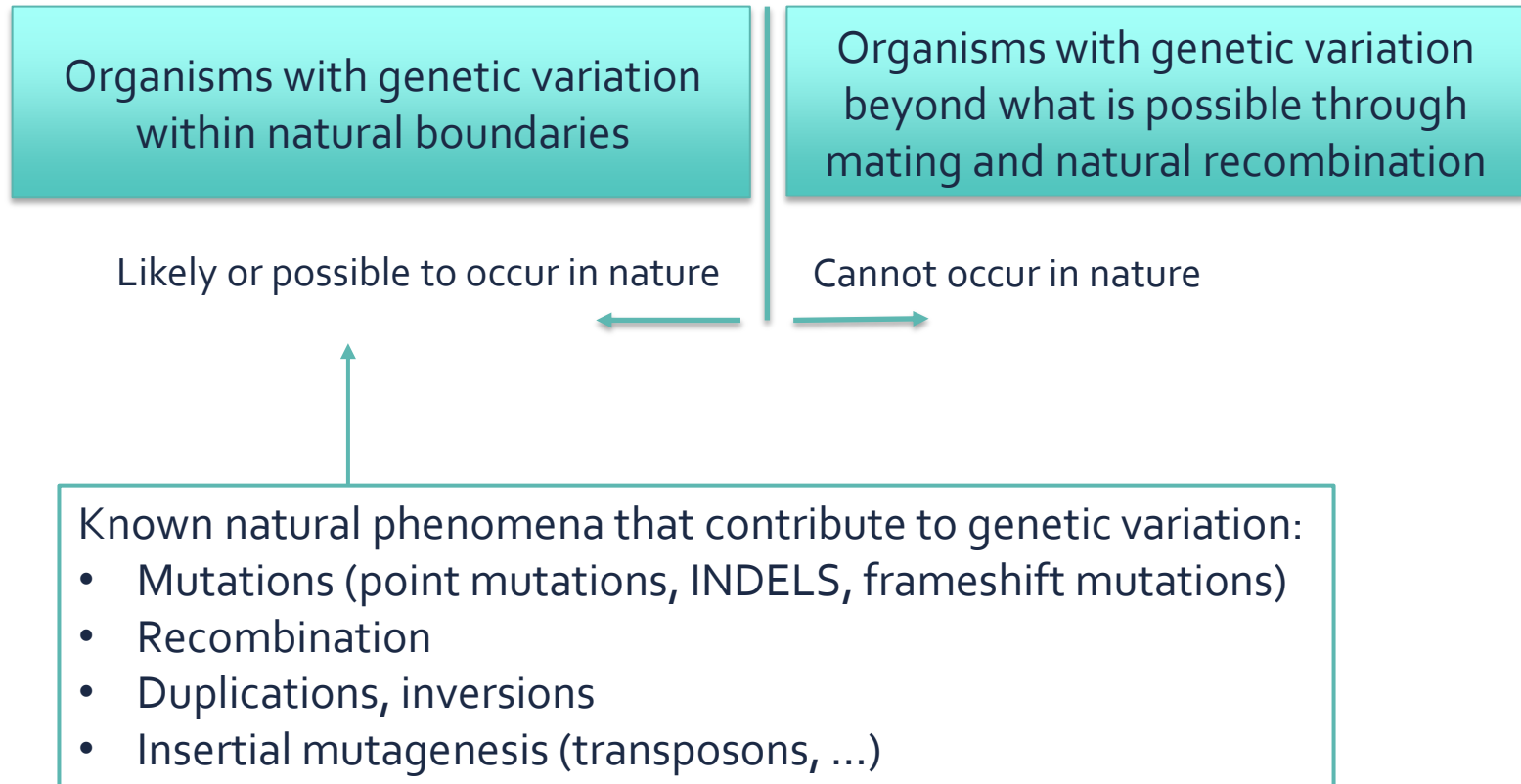
Genome editing in context of plant breeding innovation



-  'conventional breeding'
-  'GMO'
-  'new breeding techniques'



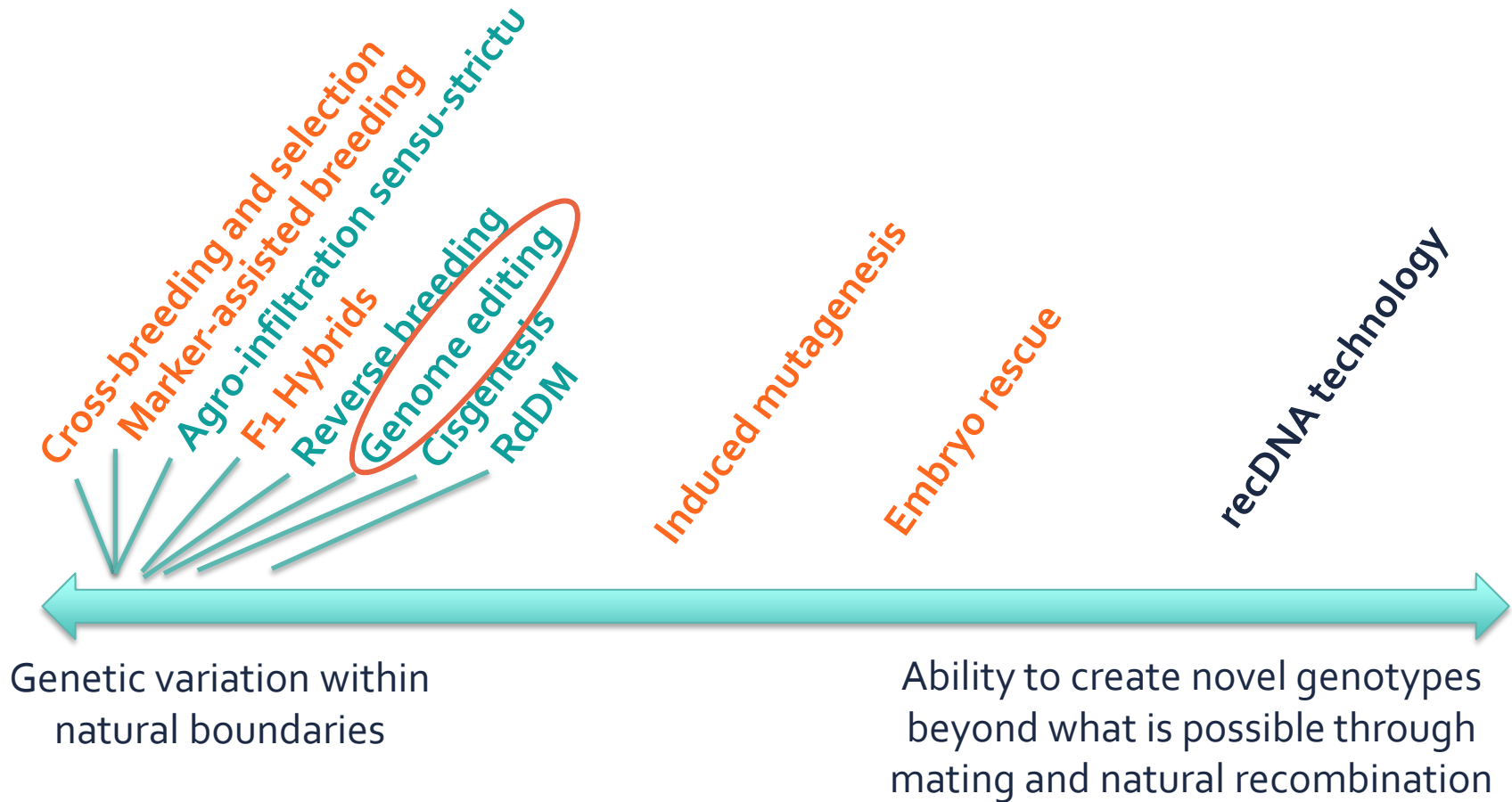
Genetic variation that can and cannot occur in nature



 'conventional breeding'

 'GMO'

 'new breeding techniques'



Genome editing is ...

1. ... a novel plant breeding technique
2. ... precision engineering
3. ... a tool to create additional genetic variation within the natural boundaries of the existing genome

Conventional plant breeding



Wild cabbage

One small
spontaneous genetic
alteration



Cauliflower

Innovative plant breeding



Deliberate
genome editing



Much more targeted
Greater precision
Up to 7 times faster

Food is more than crop plants



plants



microbes



animals



seafood



Genome editing in animals



PRSVV resistant pig



Hornless cow

An awful lot in the pipeline

- ▶ Mildew resistant wheat
- ▶ Blight resistant potato
- ▶ Amylopectin potato
- ▶ Mushroom with extended shelf life
- ▶ Non-allergenic apples
- ▶

Genome editing

Precision editing

The mere use of a genetic alteration technique is not enough to become a GMO

(Breeding 2.0)

GMO

VIB fact series





NEW BREEDING TECHNIQUES FOR PLANTS

A source of innovation for the agrofood chain and beyond

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Welcome to this information website on new breeding techniques for plants, an initiative of the New Breeding Techniques (NBT) Platform. This website is intended to provide easy access to information on new methods for plant breeding, the NBT Platform, and our products.

Please use the navigation bar on the top of this page to access this content.

www.nbtplatform.org

The New Breeding Techniques (NBT) Platform is a coalition of SMEs, large industry and prominent academic and research institutes, which strives to achieve regulatory clarity on whether or not New Breeding Techniques ('NBTs') are to be defined as leading to a genetically modified organism ('GMO').

[Read more](#) about the Platform, or [contact us](#) directly.