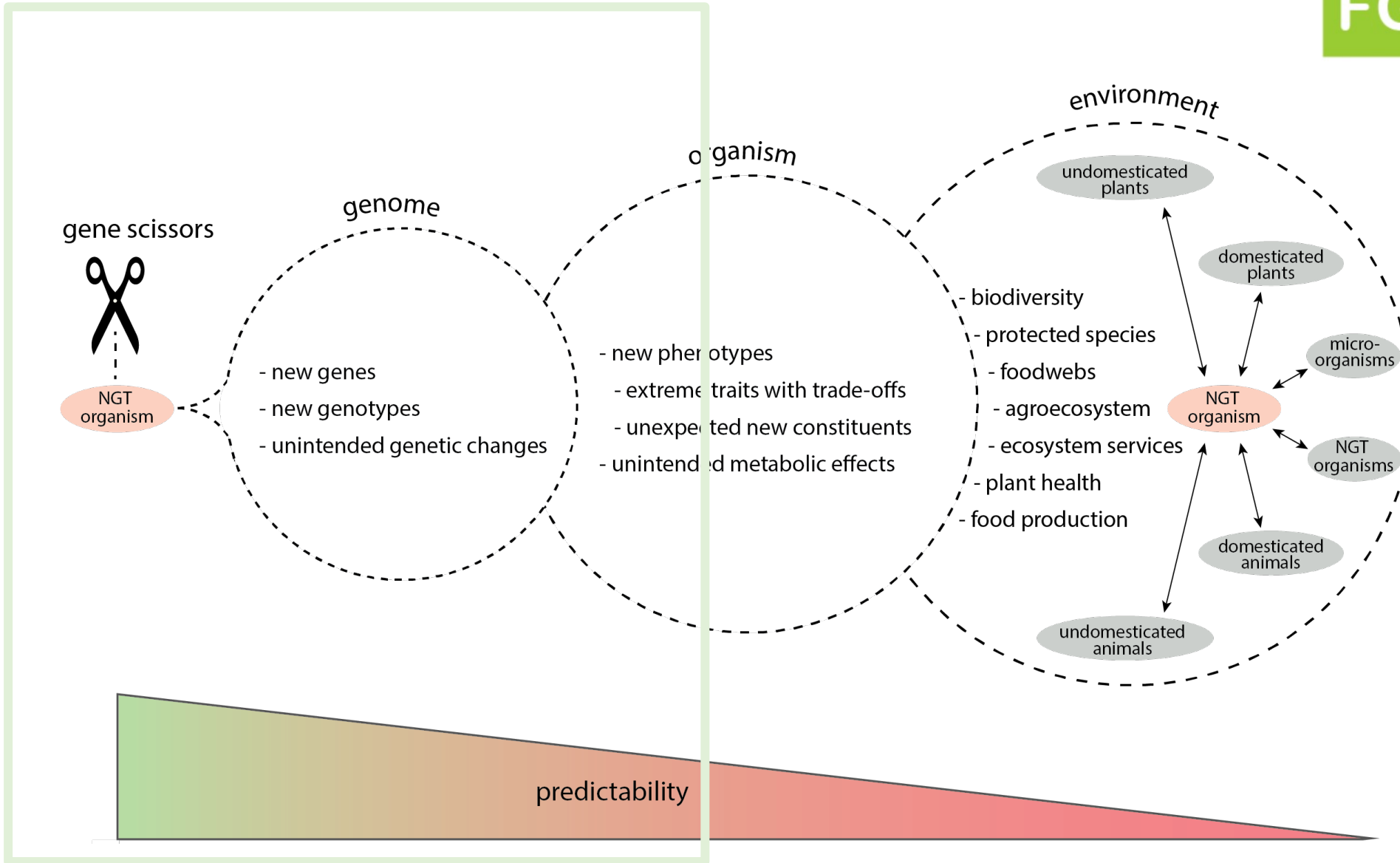
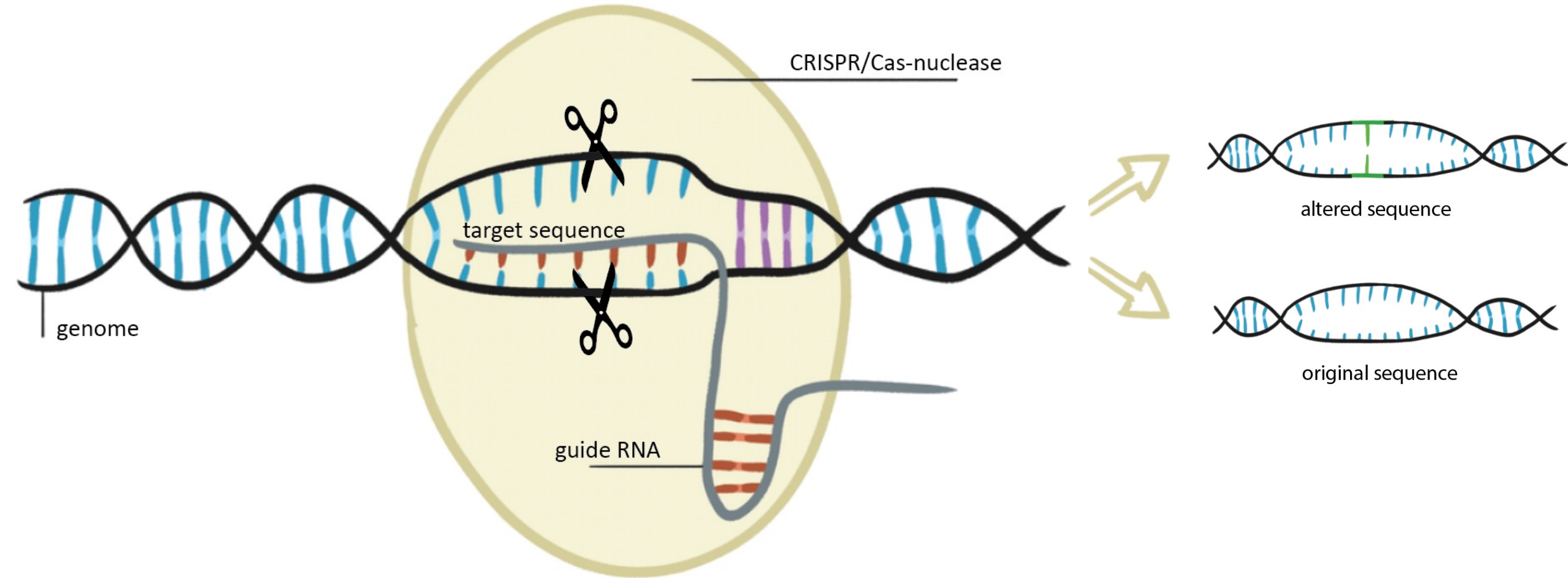


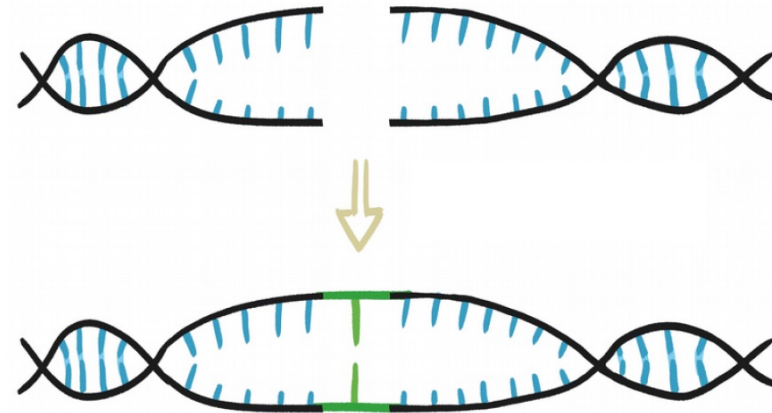
# Technical features and risks of NGT applications in food plants

Franziska Koller

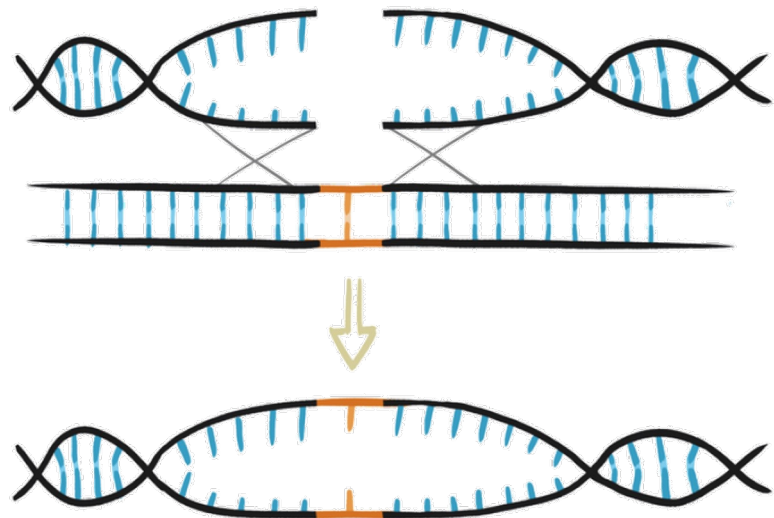




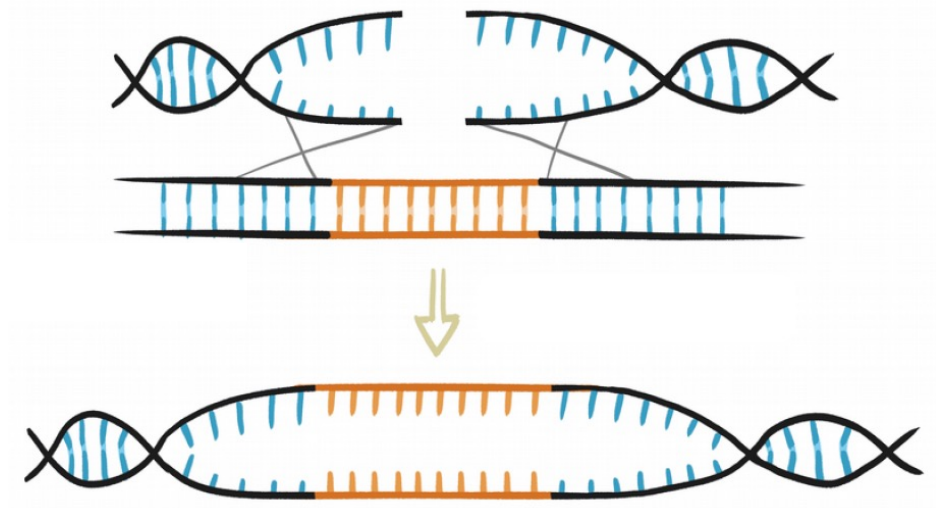
**SDN-1**

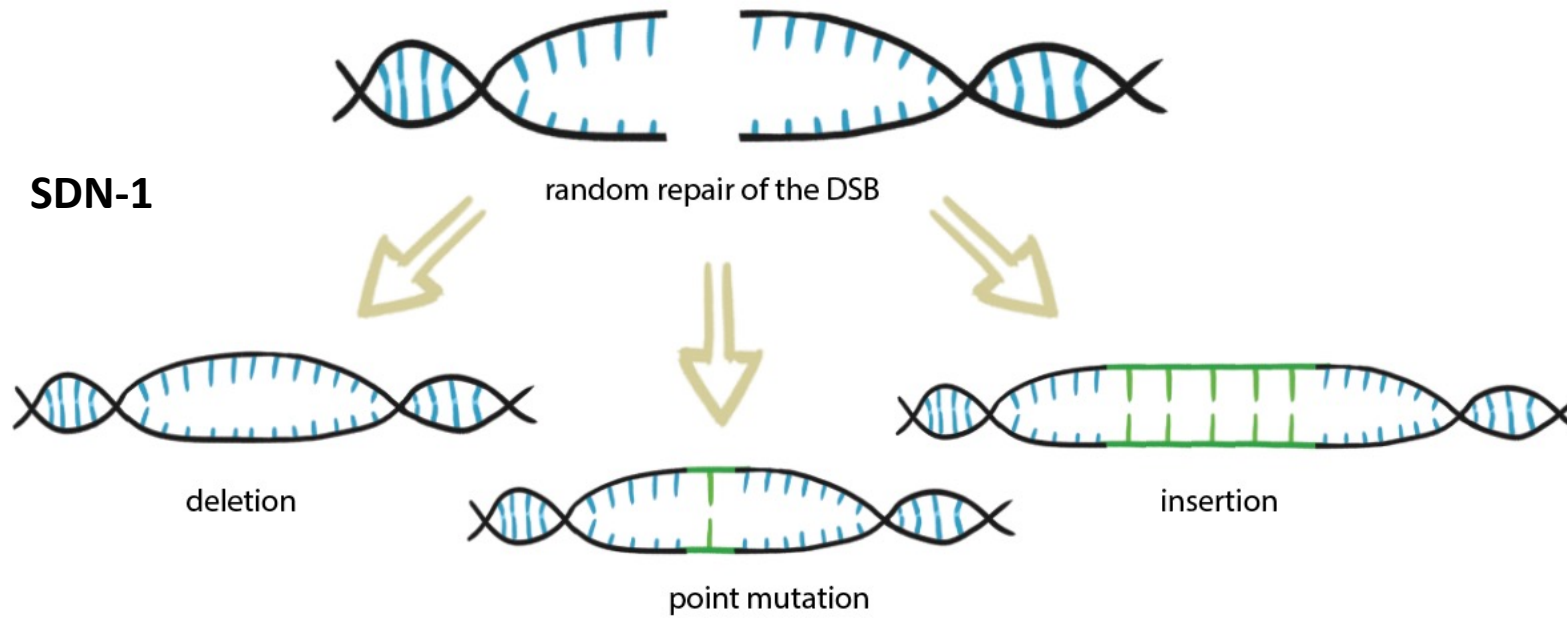


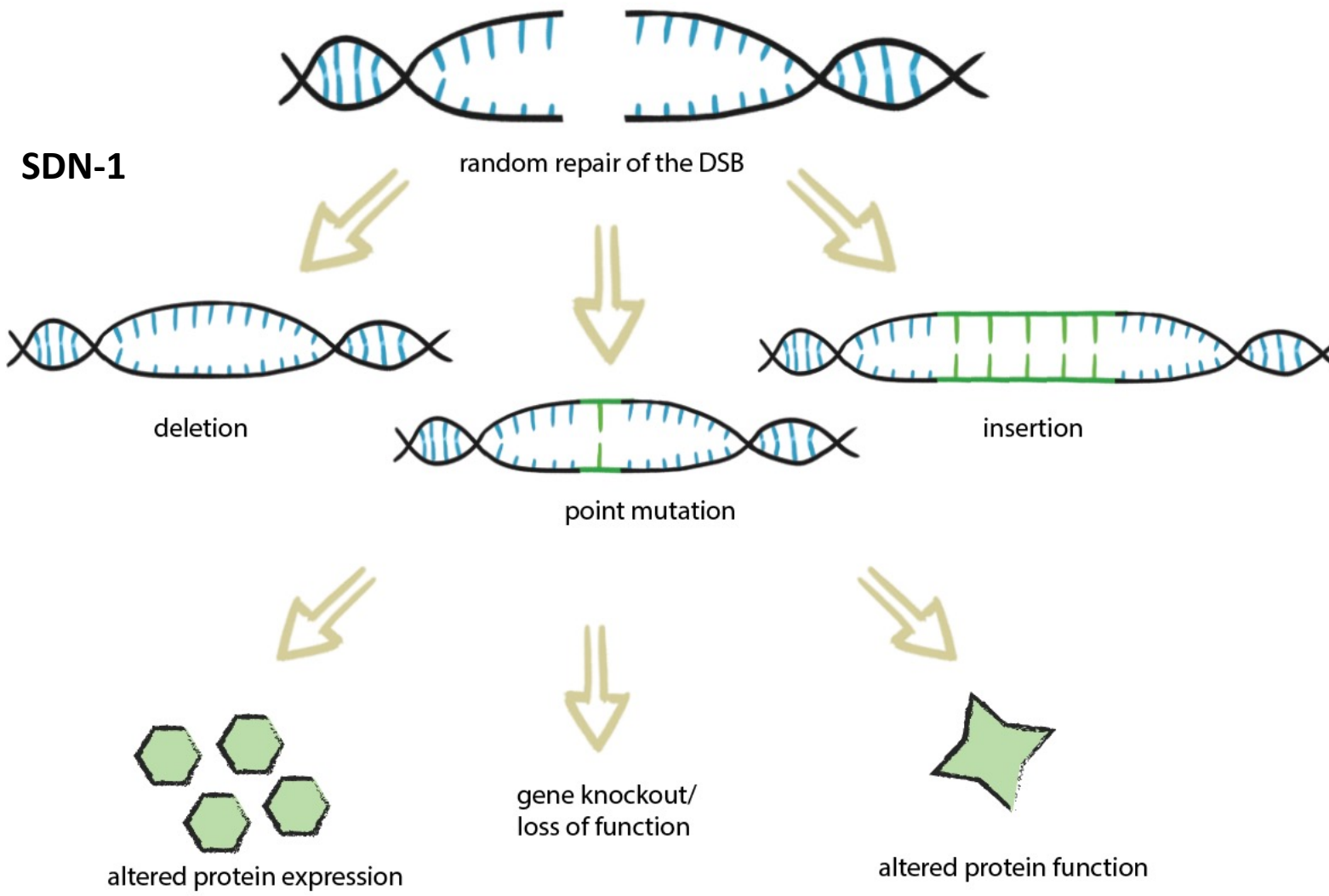
**SDN-2**



**SDN-3**

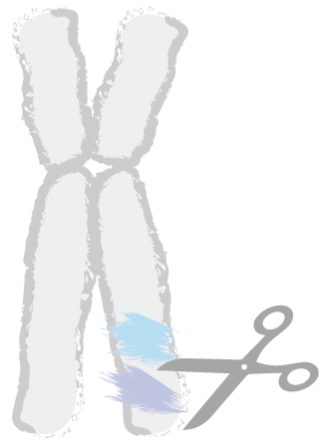
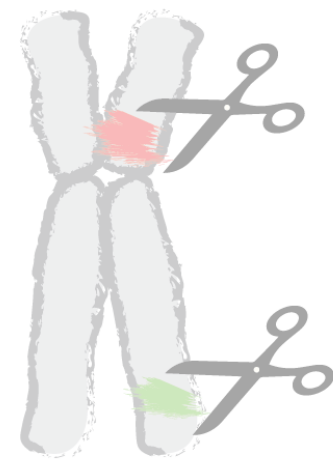






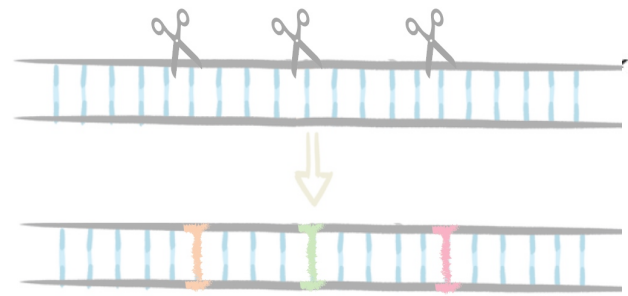


gene editing  
in regions with  
low frequency of  
mutations

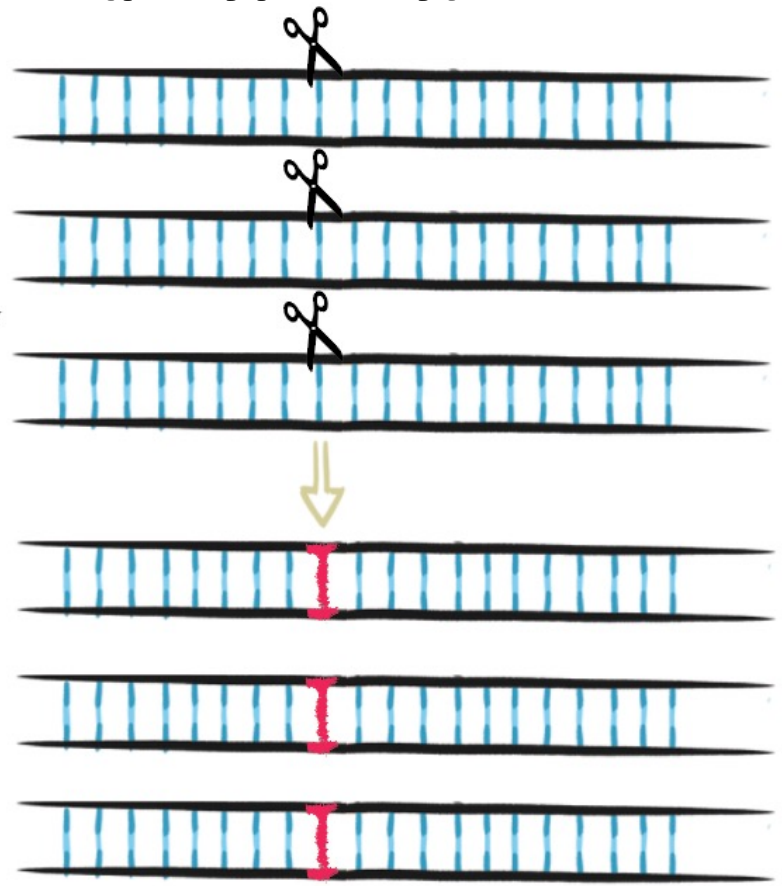


coupled genes/  
chromosomal  
rearrangement

multiplexing

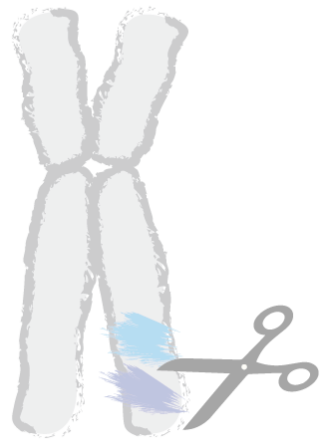
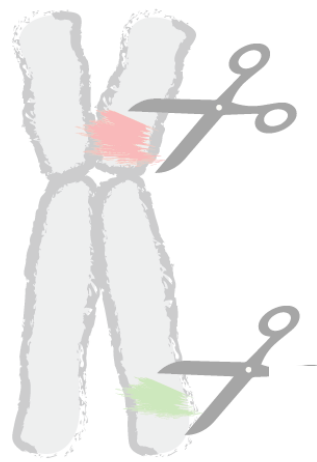


multiple gene copies  
(polyploidy)



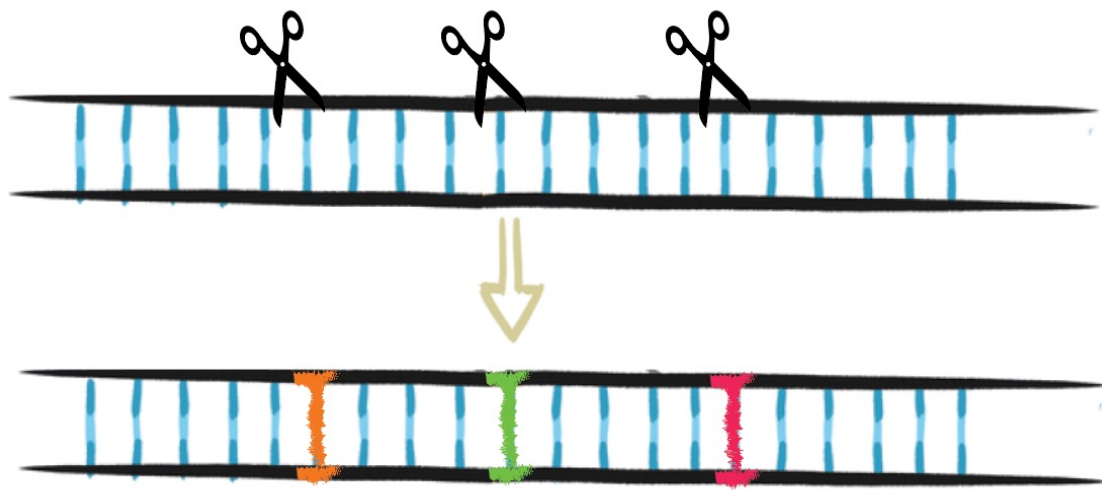
# Technical potentials of NGT and differences to conventional breeding

gene editing  
in regions with  
low frequency of  
mutations

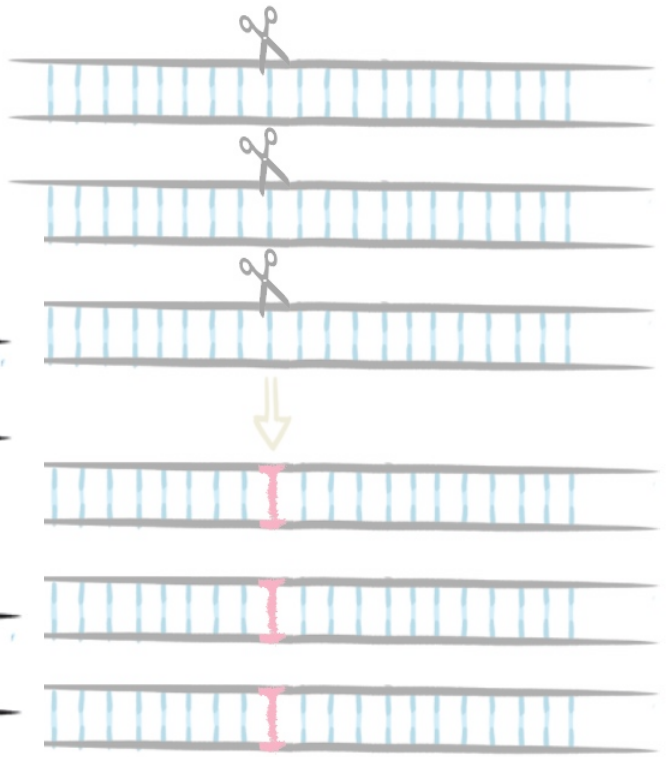


coupled ge  
chromoson  
rearrangen

multiplexing

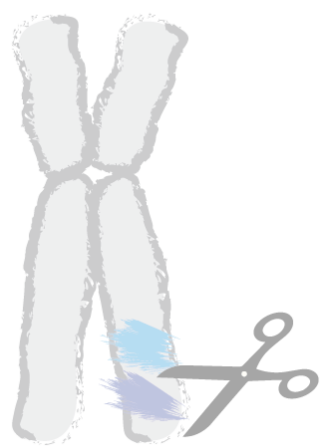


multiple gene copies  
(polyploidy)

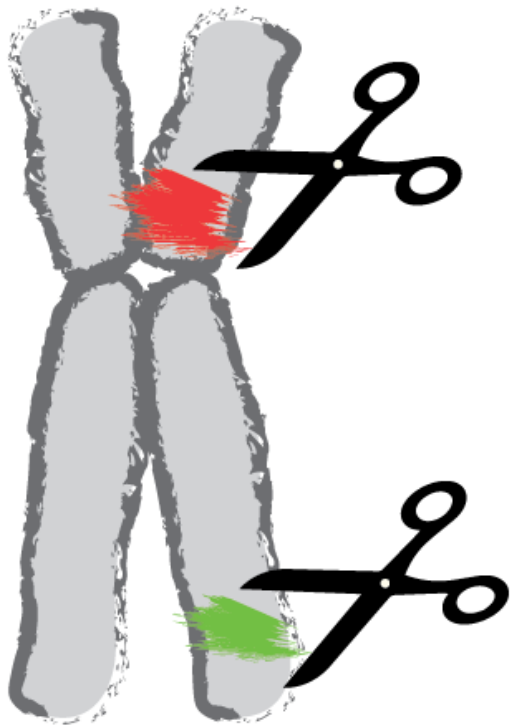




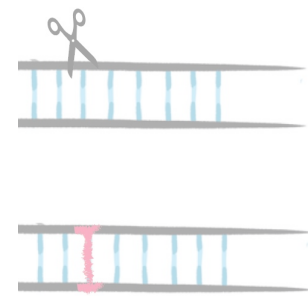
gene editing  
in regions with  
low frequency of  
mutations



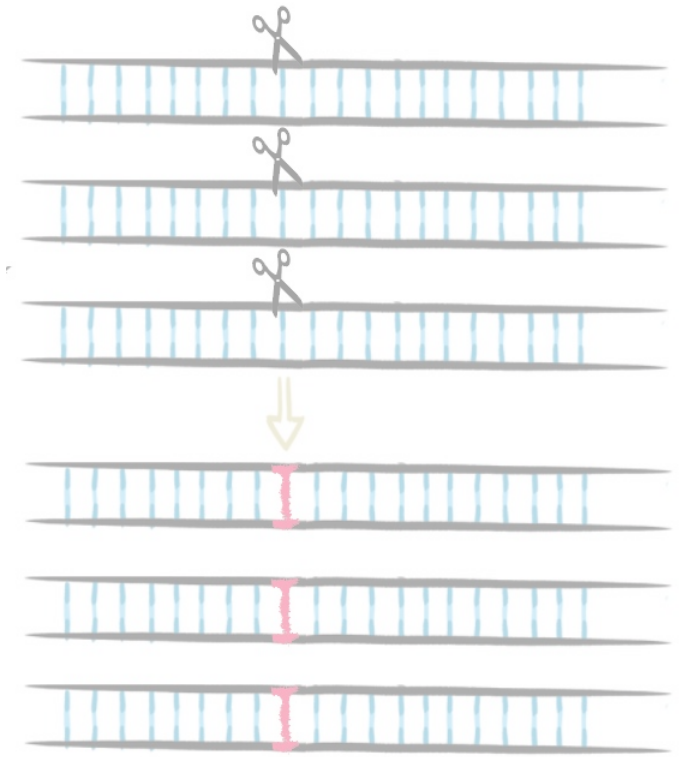
coupled genes/  
chromosomal  
rearrangement



ring

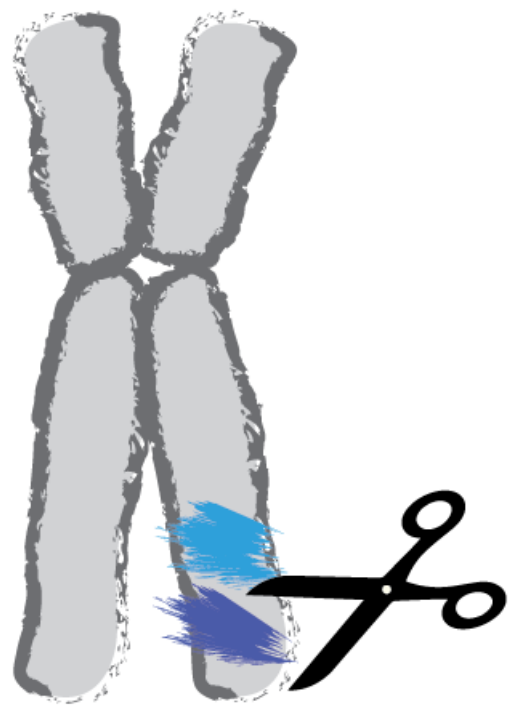


multiple gene copies  
(polyploidy)



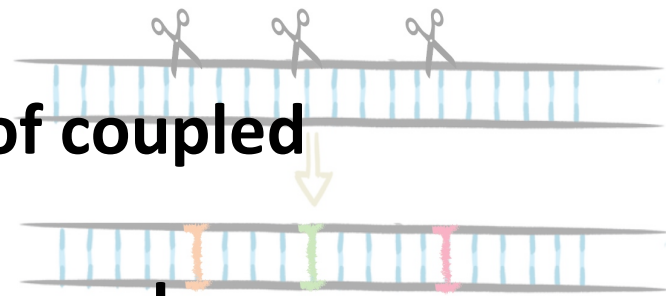
# Technical potentials of NGT and differences to conventional breeding

gene editing  
in regions with

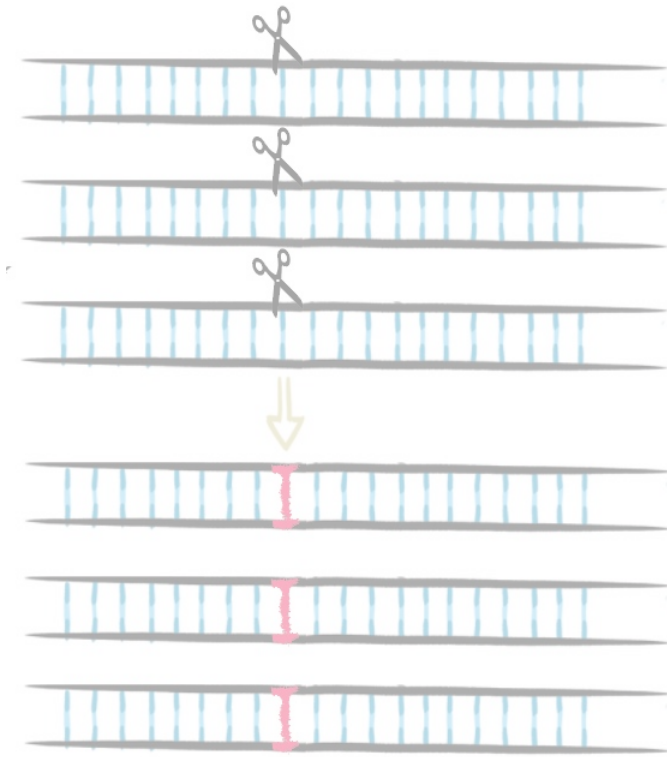


editing of coupled  
genes/  
chromosomal  
rearrangement

multiplexing

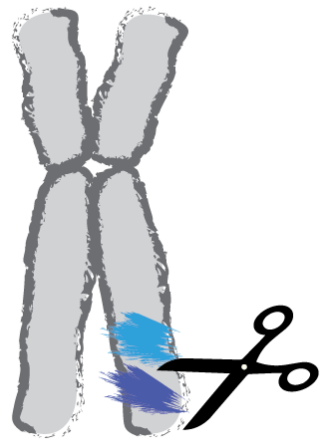
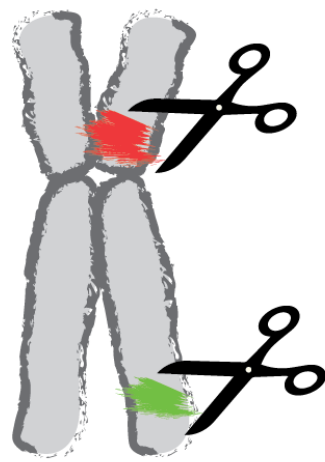


multiple gene copies  
(polyploidy)



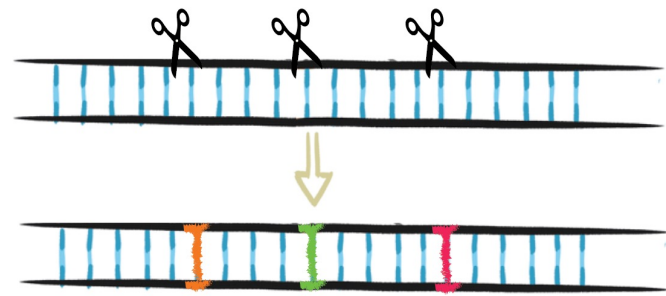
# Technical potentials of NGT and differences to conventional breeding

gene editing  
in regions with  
low frequency of  
mutations

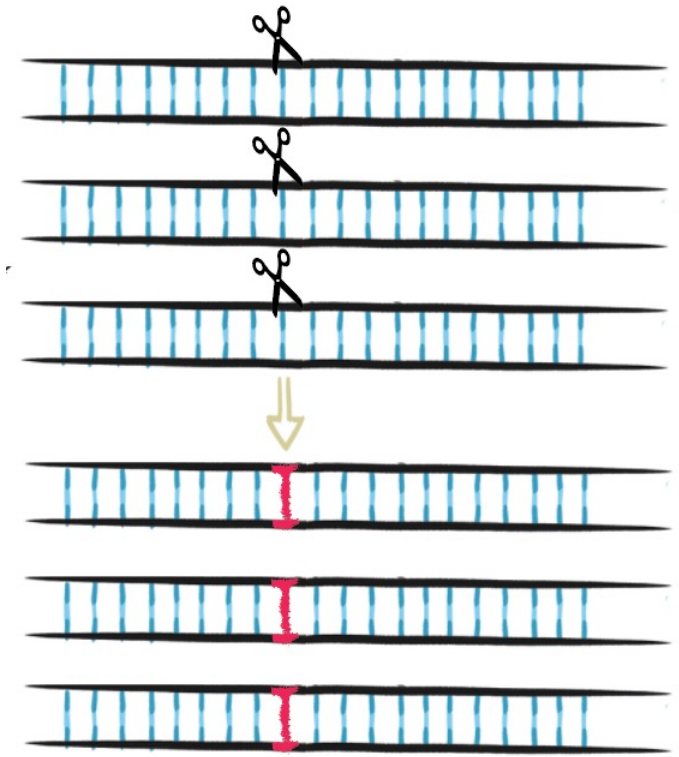


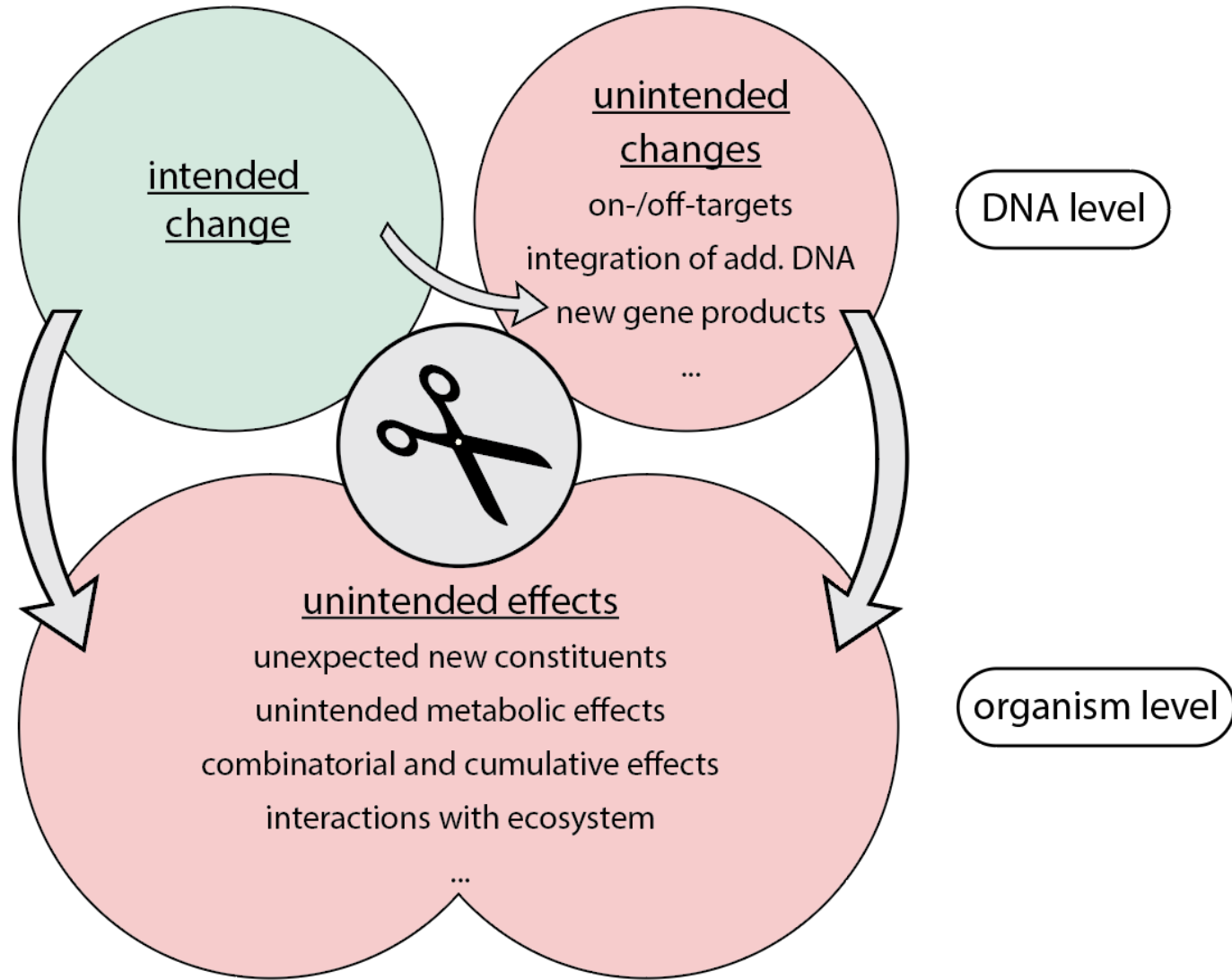
gene editing of  
coupled genes/  
chromosomal  
rearrangement

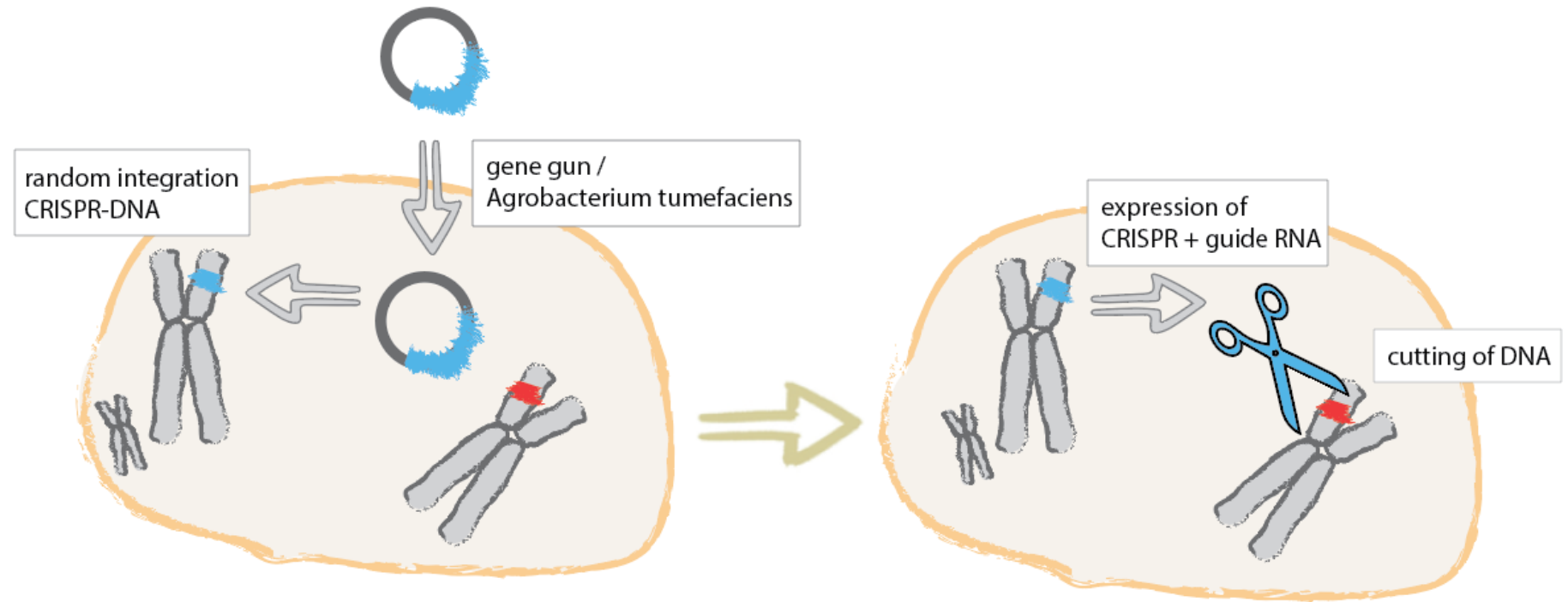
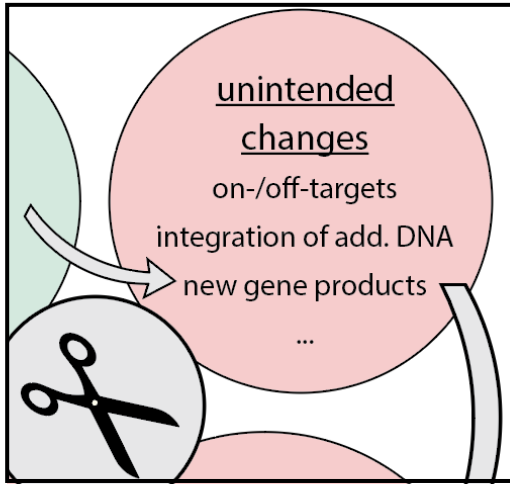
multiplexing

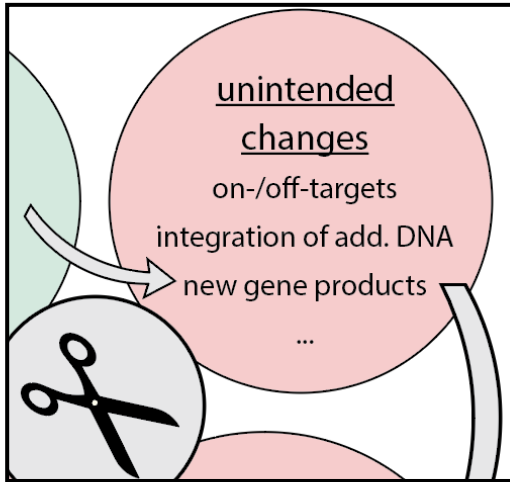


multiple gene copies  
(polyploidy)

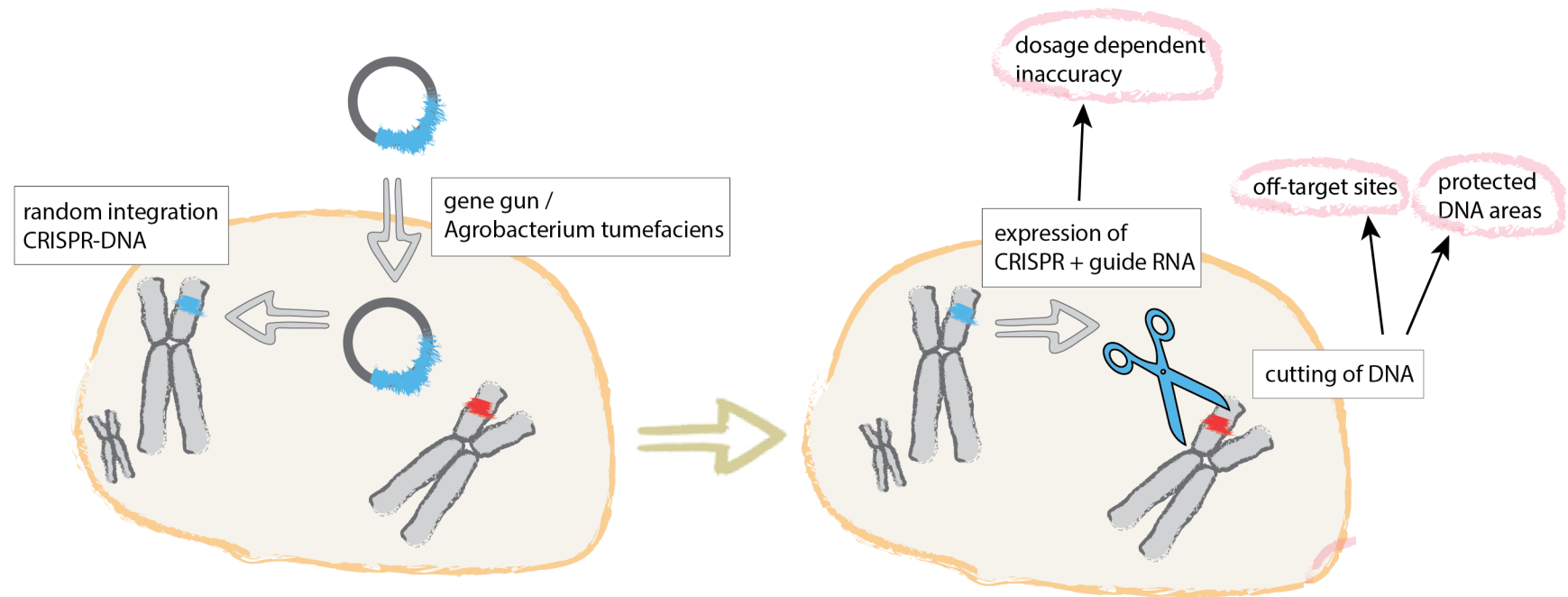




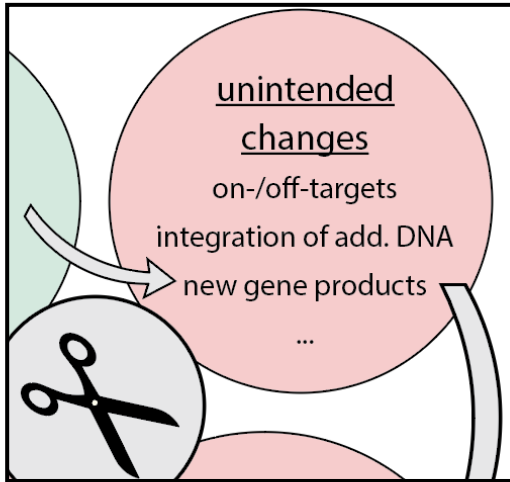




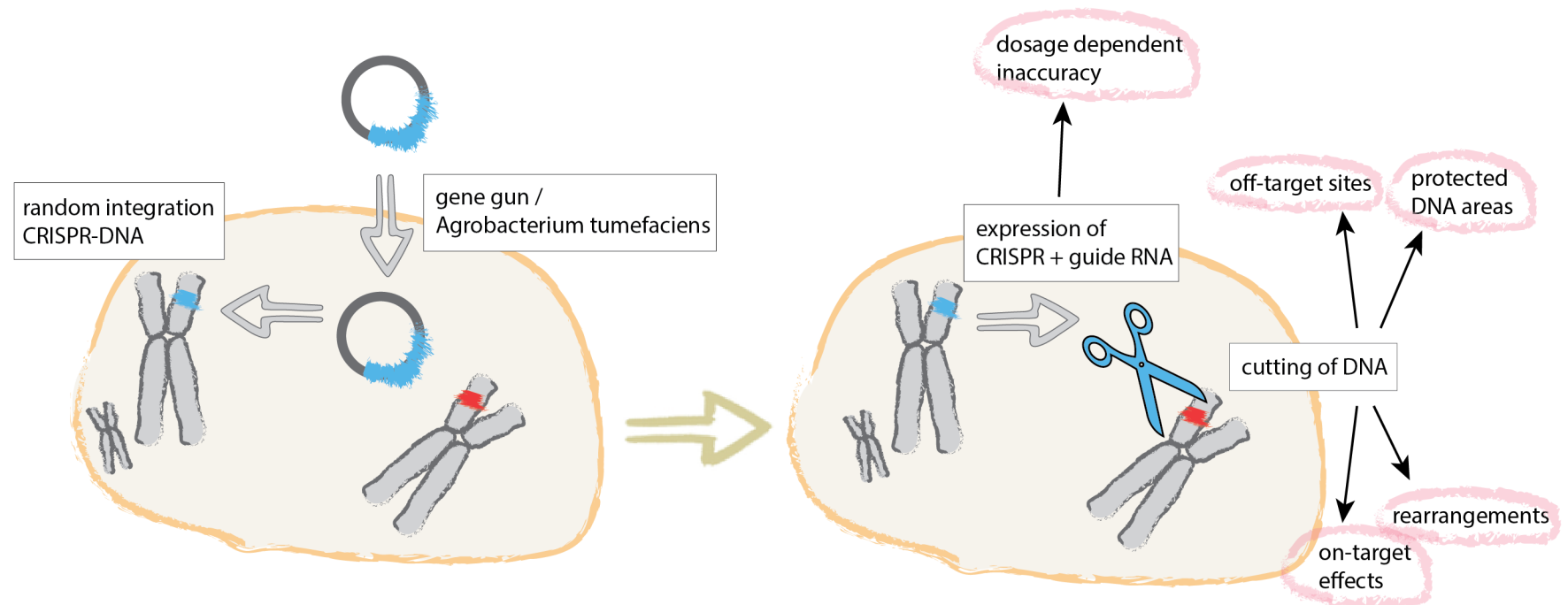
- **off-target effects**

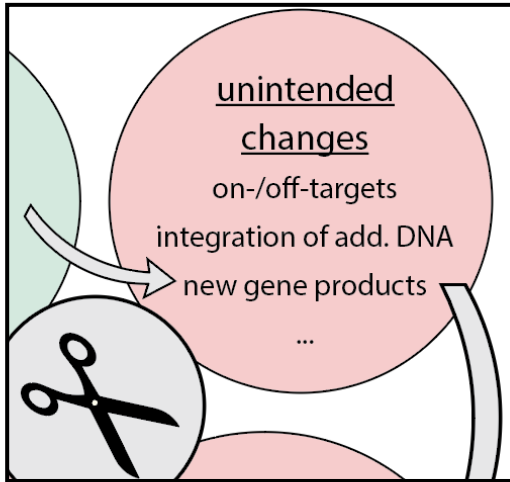




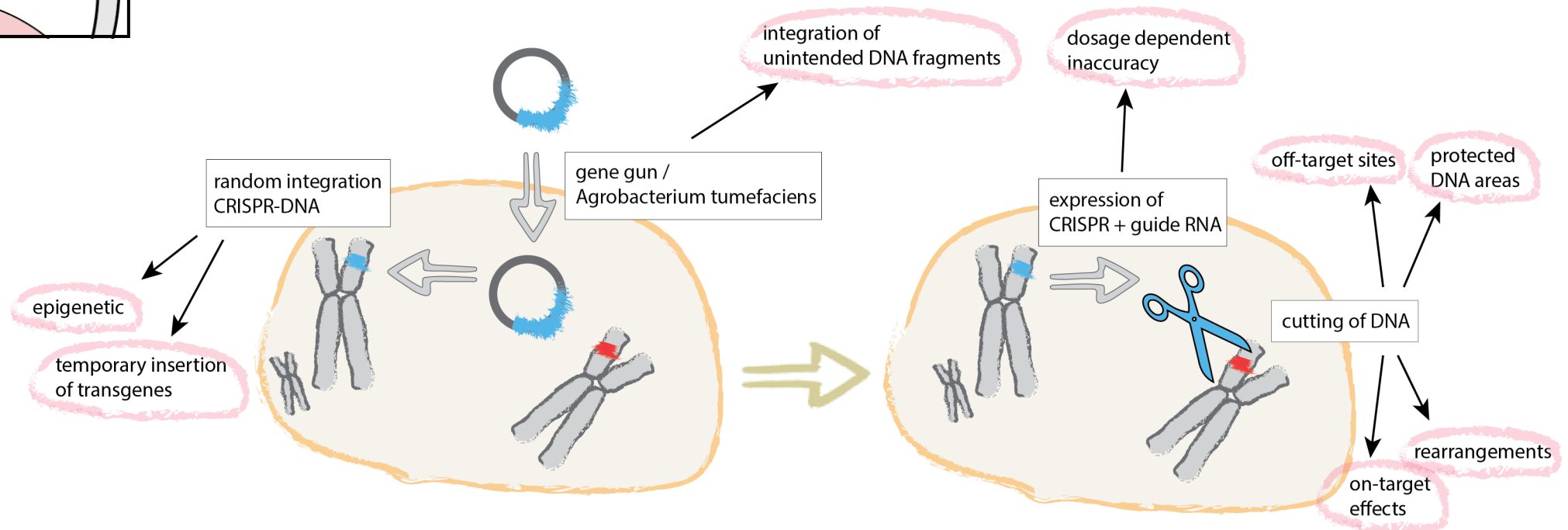


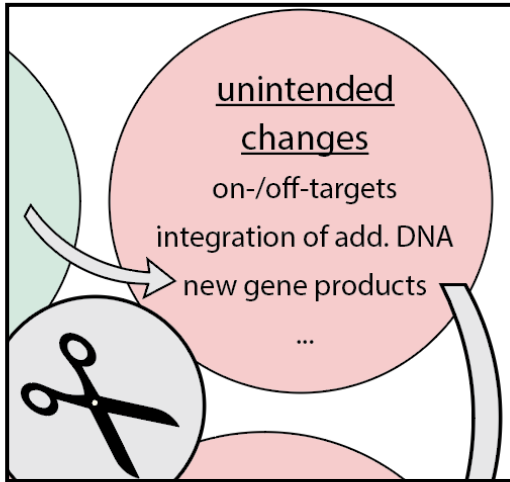
- **off-target effects**
- **on-target effects**



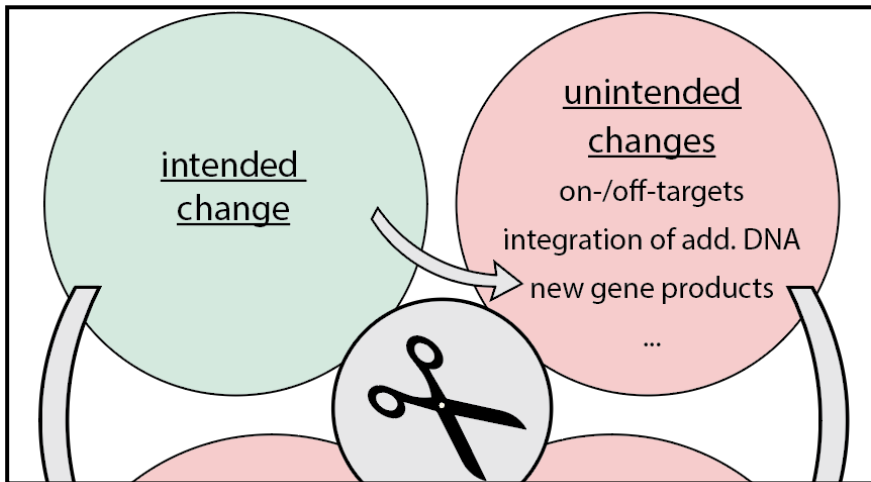


- **off-target effects**
- **on-target effects**
- integration of **unintended DNA fragments** at various parts of the genome

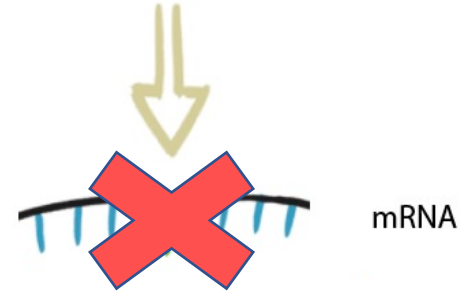




- **off-target effects**
- **on-target effects**
- integration of **unintended DNA fragments** at various parts of the genome



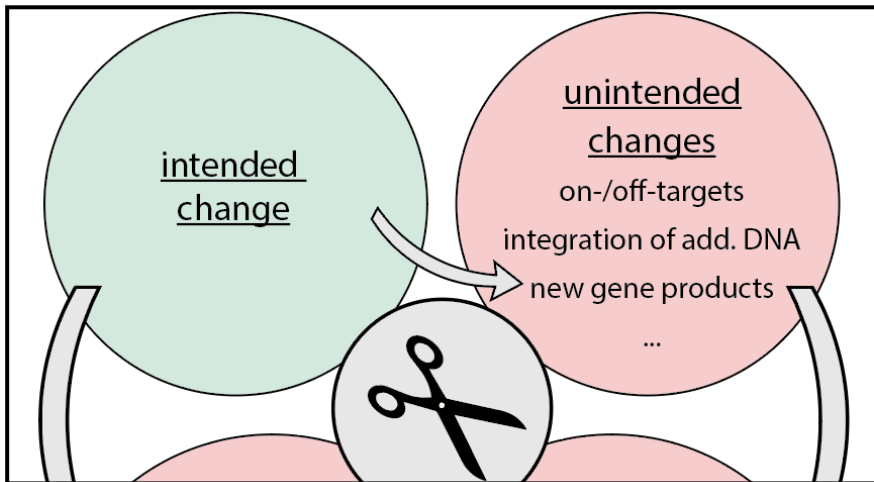
- unintended changes induced by intended genetic changes:  
formation of unintended **new gene products**



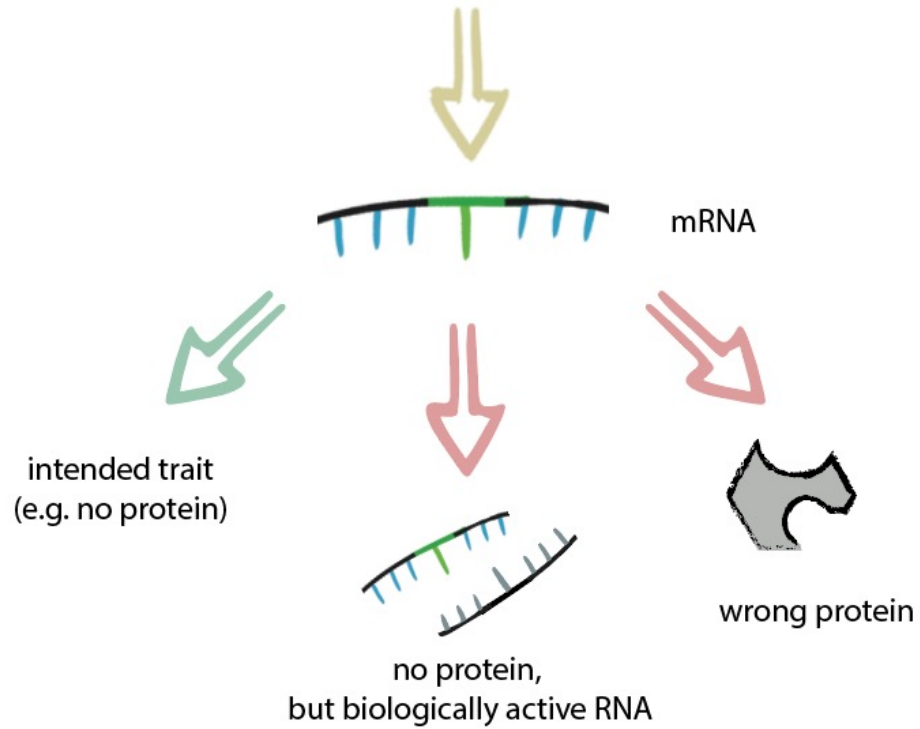
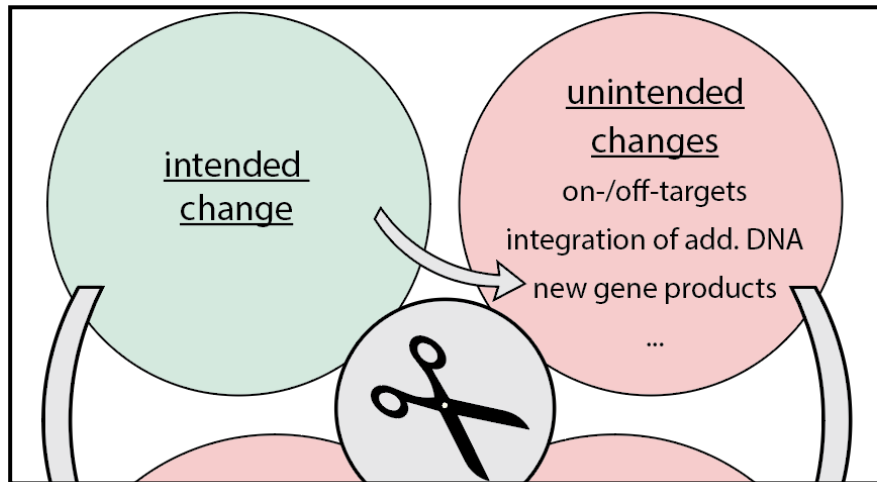
mRNA



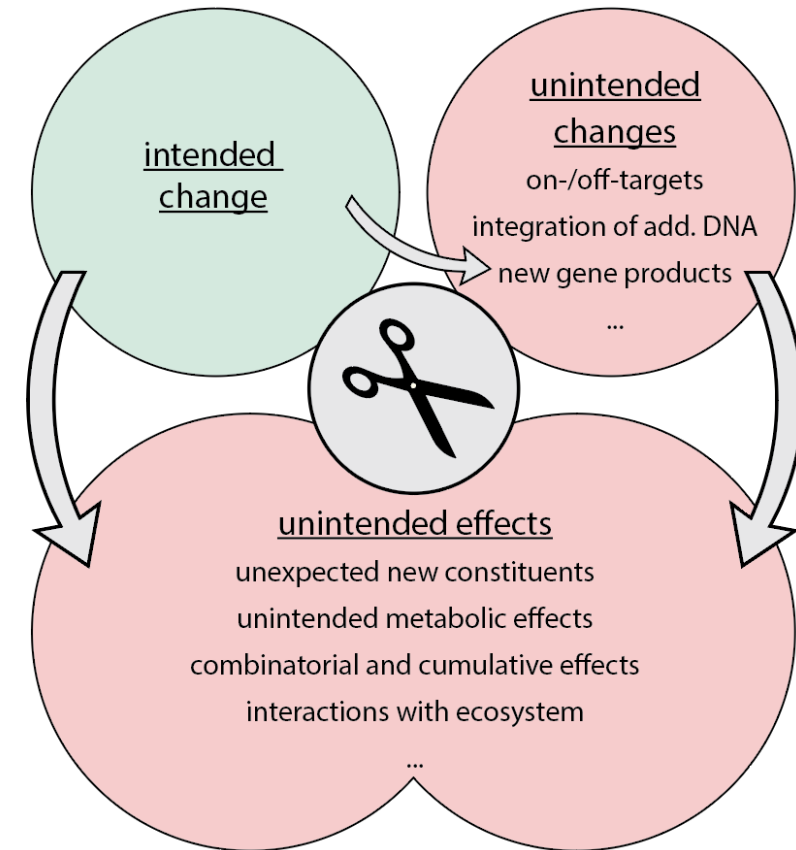
intended trait  
(e.g. no protein)



- unintended changes induced by intended genetic changes:  
formation of unintended **new gene products**



- unintended changes induced by intended genetic changes:  
formation of unintended **new gene products**



**New gene products** arise from intended and unintended changes in **new genetic background**:

DNA level

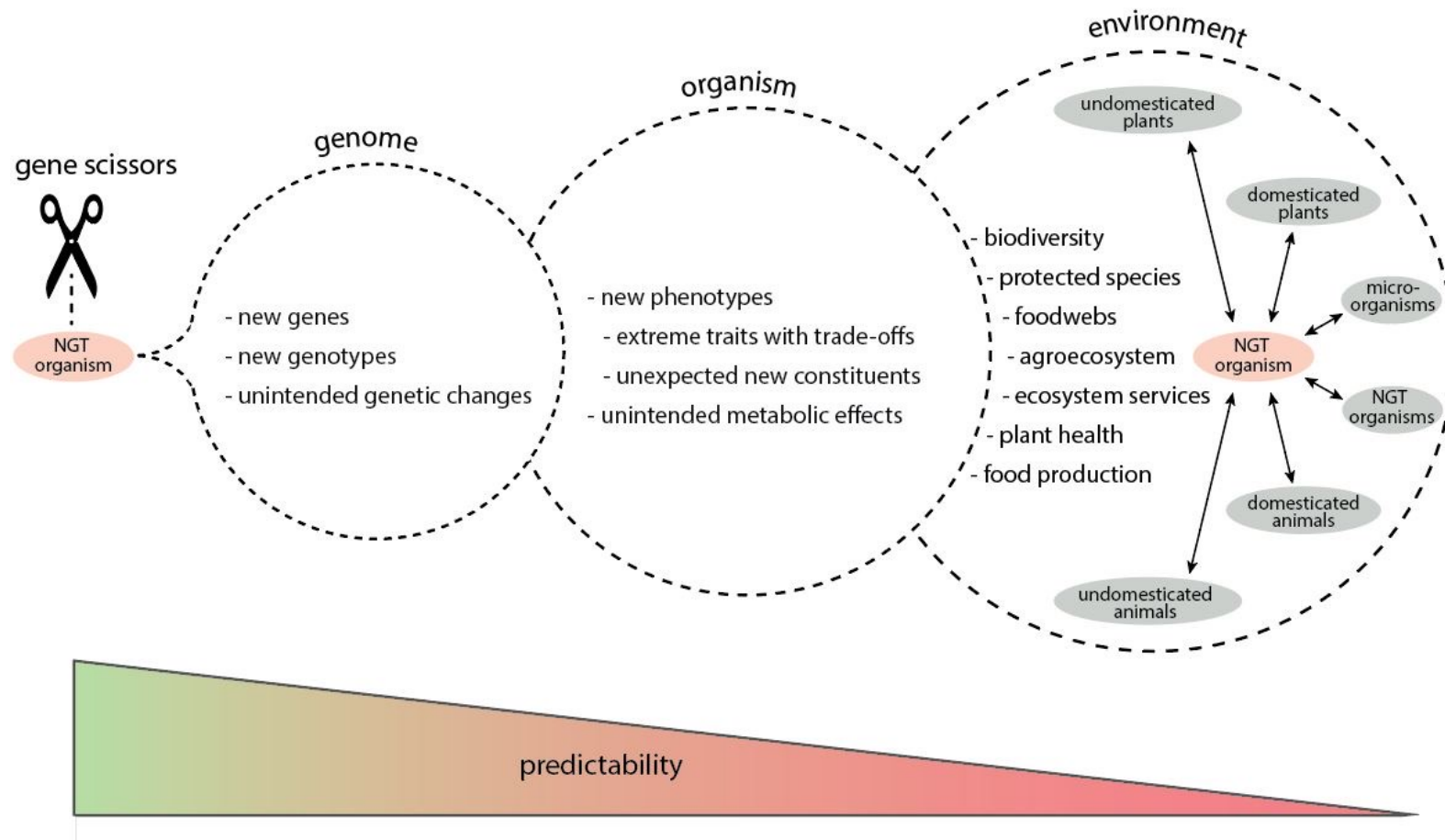
- effects on the metabolism
- effects on plant development
- effects on toxicity and allergenicity
- effects on stress tolerance (biotic and abiotic)
- effects on interactions with organisms of the same species
- effects on interactions with other organisms and the whole ecosystem

organism level



## Summary

- complex changes in the genome of plants even possible with SDN-1 application
- occurrence of unintended changes in the genome through NGT application
- occurrence of unintended effects as by-product of intended genetic changes
- influence on interaction with other organisms and the whole ecosystem



**Thank you for your attention!**