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Construct design strategies to minimize plant transgene silencing

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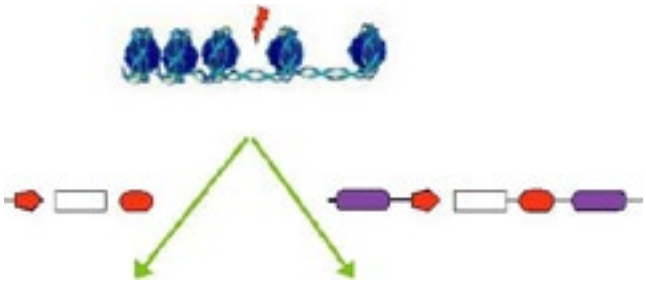
The development of methods for plant genetic transformation has enabled the production of increased yields of food and fiber and the use of plants as biofactories, however, obtaining a high and stable transgene expression is paramount to the success of any of these strategies. In our lab we want to understand the factors responsible for foreign DNA recognition and transgene silencing and to develop construct design strategies for the generation of plants with uniform and predictable expression of transgenes (Pérez-González and Caro, 2016). Integration of transgenes can interfere with resident gene function while the endogenous gene expression regulation program can affect transgene expression as well. To avoid this uncontrolled effects, we have tested the efficiency of `genetic insulators' that can somehow shelter T-DNAs and prevent inappropriate activation or repression of transgene expression by nearby regulatory elements and epigenetic states. Besides, we have considered the long known fact that certain transgenes are more susceptible to suffer silencing than others, independently of their insertion site, reflecting that there must be some signals within transgenic transcriptional units themselves that alert the host plant of the presence of foreign DNA and that trigger the initiation of the silencing response. In fact, Sidorenko et al., already showed in 2017 that the GC content of transgene's CDSs determined the level of heritable gene silencing established in Arabidopsis and maize. We have now addressed the roles of transgene promoters and terminators in the initiation of gene silencing in transgenic plants.



Biography

Elena Caro is a Doctor in Molecular Biology with 15 years of experience in the field of plant gene expression. She did her PhD in Crisanto Gutierrez laboratory (Centro de Biología Molecular "Severo Ochoa", Spain) and then moved to Los Angeles, California for a postdoctoral stay in Steve Jacobsen laboratory (UCLA). During her professional career, Elena has been the recipient of various fellowships, published her research in top journals and has been recognized with various awards. In 2014 she was recruited by the Universidad Politécnica de Madrid and started her own research line focused on Plant Synthetic Biology and Biotechnology.

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