

Titel des Projekts: Using negative strand RNA plant viruses to perform stable genome-editing in crop plants

Name Betreuer/in: Prof. Dr. Armin Djamei

Institut/Gruppe: Plant Pathology

Webpage: <https://www.inres.uni-bonn.de/pflanzenpathologie/en/research>

Voraussetzungen: our laboratory language is English

Zu erwerbende Fähigkeiten (max. 50 Wörter):

The student obtains the ability to plan with CLC a complex cloning, Golden gate and yeast-recombination based cloning, transformation of *Agrobacterium tumefaciens*, *Nicotiana benthamiana*, virus transfection assay, callus culture generation, regeneration of CrispR/Cas9/Deaminase gene-edited plants, preparation of selective media, sequencing analysis, cultivation of transgenic crop and model plants.

Projektbeschreibung (max. 150 Wörter):

Efficient plant transformation is essential for crop improvement, enabling the development of varieties with enhanced yield, stress tolerance, and resistance to pests and diseases. This project aims to develop a novel vector system based on negative-strand RNA plant viruses for the systemic expression of transgenes in crops such as maize and tomato. Viral genomes will be engineered and cloned into a Ti plasmid-based *Agrobacterium* delivery system, enabling replication and targeted transgene expression throughout the plant. To induce somatic embryogenesis and regeneration, developmental regulators will be co-expressed, facilitating transgenic callus formation directly *in planta*. This approach bypasses conventional tissue culture bottlenecks and may significantly increase transformation efficiency, especially in recalcitrant monocots. The integration of viral mobility with developmental reprogramming represents a powerful tool for plant biotechnology and may accelerate breeding pipelines for sustainable agriculture. Your work can make a difference!

Förderkonzept (max. 75 Wörter):

The student will gain comprehensive training in molecular cloning, plant transformation, and virus-based expression systems. Through hands-on work and close supervision, they will develop skills in experimental design, data analysis, and scientific communication. Exposure to cutting-edge plant biotechnology and developmental biology will provide a strong foundation for future academic or industry careers. Regular mentoring and participation in interdisciplinary discussions will further foster critical thinking, problem-solving abilities, and independent research competence.

Interesse an der Anwerbung und Finanzierung eines/r geeigneten Studierenden aus eigenen Mitteln: Nein, leider haben wir derzeit keine freien Mittel dafür zur Verfügung