

Master 2 position in Regulatory Network Analysis of Grape Flavonol Biosynthesis Gene *FLS1*

Starting date: December 2024-March 2025

Duration: 6 months

Salary: Standard salary provided by the Implanteus project

Site: Beijing, China

Institute and Department: Institute of Botany, Chinese Academy of Sciences, Grape quality regulation lab.

Project description:

Flavonols are a class of natural compounds widely present in plants, belonging to a subclass of flavonoids. Flavonols play essential roles in protecting plants from antioxidants, UV damage, biotic and abiotic stresses, and are beneficial to human health. Grape berry is rich in flavonols.

In our preliminary experiments, we observed that the expression of a key structural gene of flavonols *FLS1* increased by 200 times, while the expression level of its known transcription factor MYBF1 was remained undetectable and unchanged. These results indicate that other transcription factors contribute to regulate the expression of *FLS1*. In our earlier work, we identified several candidate transcription factors related to regulating the expression of *FLS1* through yeast one-hybrid screening.

Thus, the present project aims to validate the regulatory relationship between these newly identified transcription factors and the targeted gene *FLS1*. 1) Clone the coding sequences of candidate genes and construct of pGADT7 vectors for yeast one-hybrid assays to verify whether the candidate genes bind to the *FLS1* promoter. 2) Conduct dual-luciferase assays to detect how the candidate transcription factors regulate the transcription of the *FLS1* promoter, positive or negative. 3) Construct overexpression and silencing vectors of the candidate transcription factors and transform in grape embryonic cells and hairy root. Stably transformed materials are used for targeted gene expression analysis and flavonols analysis by qPCR and HPLC analysis.

Pre-requirements:

All master 2 students major in plant science are welcomed. We look for a motivated candidate, with experience or strong interest in plant functional molecular research, open personality, independent thinking and good skills of communication and writing will be appreciated.

Supervisor: Prof. Zhanwu Dai (Zhanwu.dai@ibcas.ac.cn) and Dr. Junhua Kong (kongjunhua@ibcas.ac.cn)

The lab: The hosting lab is led by Prof. Zhanwu Dai, who has obtained his PhD diploma from Avignon University and then worked as a scientist (CR1) at INRAE for 9 years. With in total of 13 years of experience, Prof. Dai is internationally very well known for his work on grape quality regulation research with multidisciplinary approaches, including modeling, transcriptomes, metabolomes, epigenomes, as well as phenomes. The lab is conducting world-leading projects around grape quality at different levels and have extensive international collaborations with researchers from France, Spain, Italy, Germany, South African, Belgium, Australian, New Zealand, and USA. A list of Prof. Dai's publication could be found: <https://www.researchgate.net/profile/Zhanwu-Dai/research>.