Laboratory of Plant Developmental Biology

Bio-X Institutes

• About the Lab •

Our laboratory is undertaking research projects on plant reproduction and molecular characterisation on genetically modified organisms (GMOs) supported by both national and Shanghai local government. Within the past ten years, the lab has identified and characterized over 30 genes associated with the development of inflorescence and spikelet, and the formation of pollen in rice. Various mechanisms underlying the determination of inflorescence and floral meristem, tapetal programmed cell death, communication between vegetative and reproductive cells have been elucidated. These exciting discoveries lead to about 120scientific papers in journals, such as Developmental Cell, PNAS, Nature Communications, Plant Cell, Plant Physiology, Nuclear Acid Research, and Cell Research. In addition, 14 patents for the useful genes/mutants have been obtained, and more than 20 national standard methods and 4 ISO standard methods for GMO analysis have been created based the scientific data.Website:http://zhanglab.sjtu.edu.cn/en/content.aspx?info_lb=296&flag=296

• About the Team •

Professor Dabing Zhang：(zhangdb@sjtu.edu.cn;)

1） The deputy dean of school of life sciences and biotechnology, SJTU. (2005-present).

2） Chair Professor in Shanghai Jiao Tong University (2015-present).

3） Distinguished Professor in Shanghai Jiao Tong University (2008-2015).

4） The Distinguished Young Scholar from National Natural Science Funds in 2007.

5） Yangtse Rive Scholar of Ministry of Education (2009-present).

6） Faculty Member of Faulty of 1000 (2013-present).

RESEARCH INTEREST:

1）Mechanism of the Development of Inflorescence and Spikelet in Rice

2）Molecular Controls of Rice Male Reproduction

3）Molecular Characterization of Transgenic Organisms

Website:http://zhanglab.sjtu.edu.cn/en/Show.aspx?info_lb=309&info_id=307&flag=297

• Research Fields •

We have great interest in working with motivated undergraduate students on plant biology using integrated knowledge. Opportunities are available for majors on computer science, biology and plant science. We have a broad research projects suitable for undergraduate students. Please contact us if you're interested in the following:

Project 1: Cloning and functional characterization of rice male sterile genes.

Project 2: Using genome editing technology creates rice mutants.

Project 3: Molecular characterization of GMOs.

• Responsibility •

Seminar, Experiment, etc.

• Eligibility •

- In principle, we recruit junior and senior students
- Hold at least a 2.5 GPA on a 4.0 scale
- Students of non-English speaking countries must provide English language proficiency certificate, IELTS no less than 6.0, and TOEFL no less than 90 points. If you are in the college for English teaching programs, please provide relevant certificates

- Have at least one prior research experience
- Applicants have basic knowledge of biology.
- With experience in biology research would be in advantage.

• Additional Financial Support •

N/A

• Contact •

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• Remark •

- Mechanism of the Development of Inflorescence and Spikelet in Rice

Rice (Oryza sativa), the model grass plant, has specialized morphology of inflorescence and spikelet, which determines the ultimate yield of rice. We are using various approaches such as forward and reverse genetics, biochemistry, cell biology etc. to investigate the molecular mechanisms such as MADS box genes and the regulatory network involved in the morphogenesis and development of inflorescence and spikelet in rice.

- Molecular Aspects of Rice Male Reproduction

The life cycle of flowering plants alternates between diploid sporophyte and haploid gametophyte generations. Male gametophytes develop in the anther compartment of the stamen within the flower and require cooperative functional interactions between gametophytic and sporophytic tissues. During the male reproductive development, there are numerous biological events including cell division, differentiation and degeneration of somatic tissues consisting of four concentric cell layers surrounding and supporting reproductive cells as they form mature pollen grains through meiosis and mitosis. To understand the mechanism of plant male reproduction, we are combining systematic biology (genomics, transcriptomics, proteomics, metabonomics) with other approaches such as genetics, cell biology, biochemistry, and structure biology to elucidate the molecular mechanism underlying each biological process of male reproduction, such as cell-to-cell communications, programmed cell death, and fatty acids metabolism.

- Molecular Characterization of Transgenic Organisms

As more and more transgenic crops such as transgenic maize and soybean have been approved and consumed as foods and feeds, concerns about the safety of transgenic organisms among consumers and public increase Molecular characterization of transgenic organisms is the base for the safety assessment of transgenic organisms. We are developing detection methods to identify the changes occurred at genomic, transcriptomic, proteomic and metabolic levels, and to compare those changes between transgenic line and non-transgenic control line and between transgenic line and conventional cultivated lines, laying a foundation for safety assessment.