升遗传学教学的质量, 弥补传统实验教学的不足, 而且有利于开阔学生的视野、提高学生设计实验、运用理论知识分析和解决实际问题的能力, 也有利于培养学生的协作精神。与传统模式不同, 本实验着重培养学生的动手能力和创新意识。教师可从多个方面启发和引导学生, 即查询资料、选择材料和仪器、制定实验方案、实验操作和最后的结果分析, 整个实验过程可由学生自行完成。不仅符合循序渐进、因材施教和发展性教学原则, 还能充分调动学生的积极性和创造性, 使学生有独立思考、自主学习的空间和时间, 从而大大提高学生的实验技能和综合应用知识能力, 同时也可有效提高教师实验教学的效果。

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Design and Practice of a New Teaching Project of the Map-based Cloning Experiment in Genetics

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Abstract Recombination, linkage and crossover of chromosomes are the key and difficult points in genetics teaching. For students' comprehensively understanding these concepts in teaching, we designed a new genetic experiment named 'Gene mapping using DNA molecular markers' based on the principle of the map-based cloning method, using our previous studies on cloning of a rice lesion-mimic phenotype regulating gene *SPOTTED LEAF 5* (*SPL5*) as an example. In this experiment, students are instructed to perform the linkage analysis, genetically map the *spl5* mutation and align a genetic map by using an F_2 population generated by a cross between *spl5* and wild-type plants and polymorphic molecular markers. This teaching experiment can not only effectively promote students' understanding of the three Laws of genetics, but also be helpful to broaden their vision and improve their ability to solve problems and work in a team.

Key words genetics, comprehensive designing experiment, map-based cloning, educational resources

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