

综述

植物远缘杂交和多倍体化中的表观遗传变异

刘宝 郝水

东北师范大学分子表观遗传学教育部重点实验室, 长春130024

摘要:

植物不同种间乃至属间的天然远缘杂交是经常发生的事件, 是新种形成的重要方式, 也是人工培育作物新品种的有效手段。但关于杂交导致新种形成的过程和机制一直不清楚。近年来的研究表明, 植物发生远缘杂交以及此后的多倍体化过程可以产生大量的、不能用经典遗传规律解释的可遗传变异, 其中大部分变异是表观遗传变异

(epigenetic variation)。已经发现的杂交及多倍体化诱导产生的表观遗传变异主要是编码基因和转座子DNA甲基化水平和模式的改变, 但可以推测与之相关的组蛋白修饰和染色质结构也可能发生变化。目前对此类表观遗传变异的分子机理尚缺乏研究, 进一步对植物远缘杂交和多倍体化诱导产生后的表观遗传变异的深入研究将有助于理解这类变异的进化意义及其在作物改良中的更有效的利用。

关键词: 植物远缘杂交 杂种 多倍体 表观遗传变异

Epigenetic Variation Associated With Plant Wide | Hybridization and Polyploidy

LIU Bao, HAO Shui

Key Laboratory of Molecular Epigenetics of MOE, Northeast Normal University, Changchun 130024, China

Abstract:

Sexual hybridization between different species or genera in plants is a common phenomenon in nature, which represents a predominant model of speciation, whereby rapid hybridization barrier may form and new species can emerge sympatrically with its parental ones. These wide hybridizations are also an effective means for crop improvement. But the mechanistic basis by which new species forms via this means remains largely elusive. Recent studies over the last several years have demonstrated that wide hybridization and subsequent genome doubling (pelyploidy) often induce an array of variations that could not be explained by the conventional genetic paradigms. A large proportion of these variations are epigenetic in nature. All hybridization and/or pelyploidy-associated epigenetic variations so far uncovered are alterations in cytosine DNA methylation. Nonetheless, it is conceivable that other epigenetic modifications like histone covalent modification and chromatin remodeling, which were known as interlaced with DNA methylation, may also subjective to modifications upon hybridization and/or pelyploidy. Further basic studies on epigenetic variations generated by wide hybridization and polyploidy may shed light on the mechanisms generating these variations, and will enhance our understanding on their evolutionary significance, as well as enable us to more effectively utilize these variations in crop breeding.

Keywords: plant wide hybridization hybrid polyploid epigenetic variation

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通讯作者: 郝水, 中国科学院院士, 教授, 博士生导师, 主要从事作物远缘杂交与遗传改良以及真核生物染色质结构与功能研究。

作者简介: 刘宝|教授|博士生导师|主要从事植物表观遗传变异和作物改良研究。Tel: 0431-85099822; E-mail: baoliu@nenu.edu.cn。

作者Email:

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