THE CHINESE UNIVERSITY OF HONG KONG

SCHOOL OF LIFE SCIENCES

Epi-genomics, a new opportunity for plant bioengineering: "A case study of tomato fruit development and epigenome reprogramming"

by

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Genetic modification is one of the most powerful technologies for crop improvement. It has been shown that fruit ripening is controlled by the plant hormone ethylene[1]. But ethylene responsiveness is restricted by an unknown developmental cue that could not be altered by genetic engineering. We have recently found that fruit developmental is controlled by a global epigenome reprogramming event, which specifically targets MADS-box transcription factor binding sites in the promoter of ethylene genes[2]. This shows that the epigenome is not static as we once thought, and is likely selected by evolution to insure fidelity of irreversible developmental processes such as fruit ripening. Our findings also demonstrate the usefulness of epigenetic engineering in areas that conventional genetic modification could not go[3], and highlight the importance of considering future crop improvement strategies that not only focus on DNA sequence, but also the information encoded in the epigenome.

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