

Effect of DNA methylation on the floral morphology of *Linaria vulgaris*



Figure 1. Bilaterally symmetric type (left) and radially symmetric type (right) of toadflax flowers. (Cubas et al., 1999, Nature, 401, 157-161)

Yellow toadflax (*Linaria vulgaris*) is a common weed in Nova Scotia with striking yellow and white colouring, coining it the name "butter-and-eggs". The plant usually has bilaterally symmetric flowers with a tube-like structure due to the fusion of its five petals during floral development. In nature, toadflax flowers may also take on a different form, in which the five petals are separate and the flower assumes a radially symmetric shape. Recent studies have revealed that these distinct floral phenotypes are a result of epigenetic differences between plants.

The study of epigenetics examines how changes in gene expression alter morphology, rather than changes in genetic sequence. In the case of toadflax, plants with the same genetic sequence express different flower types depending on if these genes are expressed or silenced. Gene expression may be influenced by different environments, which in turn cause some genes to be methylated, thus silencing them and resulting in the altered floral structure.



Figure 2. Triweekly watering of toadflax with 50mL of BPA solution

Bisphenol A (BPA) is a common environmental contaminant that has been linked to changes in DNA methylation in a variety of organisms. By watering toadflax plants with different concentrations of BPA solution over the course of their growth, the effect of DNA methylation on floral development can be analyzed, as toadflax may be capable of displaying a spectrum of floral types depending on their level of DNA methylation.



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