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Discovery of the protein involved in the process of flower formation



An international group of researchers characterised the network of genes regulated by the transcription-factor (protein controlling the activation and inactivation of other genes) APETALA1, the authentic orchestra conductor of the flowering process. This discovery contributes to a better understanding of developments of the process and the mechanisms by which plants bear fruits. The research, recently published in *Science*, was directed by UAB-participant Centre for Research in Agricultural Genomics (CRAG), the Spanish National Research Council (CSIC) and the Institute for Food and Agricultural Research and Technology (IRTA).

Deep sequencing methods were used in *Arabidopsis thaliana* to identify the genes directly controlled by APETALA1. According to the study, this transcription factor controls the activity of many other genes which in turn regulate plant development or floral growth.

"In some ways APETALA1 acts as the orchestra conductor, coordinating the activity of different development programmes over time. Thus, it first represses the vegetative programme -when

plants produce leaves- and then activates the reproductive programme -in charge of producing flowers", explains José Luis Riechmann, research director and ICREA researcher at CRAG.

Although the full mechanism remains unknown, the APETALA1 transcription factor was not foreign to scientists. Recent studies, also carried out with *Arabidopsis thaliana*, determined that the protein's function consisted in first initiating the formation of floral meristems (groups of undifferentiated cells from which different parts of the plant are formed: roots, stem, leaves and flowers) and second, in developing the sepals and petals of flowers, two of the four types of organs which make up the flower (the other two being its reproductive organs, stamens and carpels).

"When APETALA1 and another very similar gene, CAULIFLOWER, are inactive, the plant produces a large amount of meristems unable to undergo differentiation", explains Riechmann. The plant continues to grow in its vegetative phase and this results in the growth of a cauliflower or broccoli, for example.

Also familiar to scientists were that the mechanisms by which plants determine the optimal moment to flower (e.g. it recognises the seasons, whether winter has passed or how long the days are) are governed by the activation of the gene APETALA1. However, scientists are still working on discovering the mechanism which activates this gene.

The research, published in *Science*, was initiated by José Luis Riechmann at the California Institute of Technology (Caltech). Upon returning to Spain, Reichmann and his current research team continued the study. In addition to researchers from Barcelona and Valencia, participating in the study were researchers from Ireland (Trinity College, Dublin) and The Netherlands (Plant Research International).

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References

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