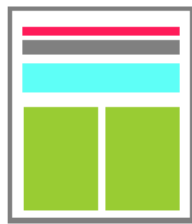


## Anatomy of a scientific paper



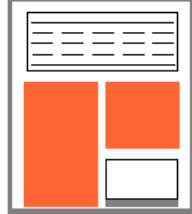
### TITLE

### AUTHOR INFORMATION

**ABSTRACT:** A summary of the study and findings, written by the author.



**INTRODUCTION:** A statement of what is currently known about the study subject that articulates the questions being investigated. It cites other scholarly works, lays the foundations for the study, and sometimes states a hypothesis to be tested.

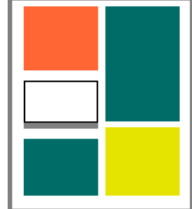


**RESULTS:** A description of the research conducted and the results obtained.

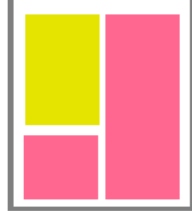
Results are presented as tables, large datasets, and figures, which can include graphs, videos, diagrams, and photographs.



Some papers include additional supporting data as a supplement.



**DISCUSSION:** An analysis and interpretation of the data presented that integrates the new information with prior findings, states the implications of the work, and sometimes generates new hypotheses to be tested.



**METHODS:** A description of how the studies were conducted, with sufficient detail so that others can repeat them exactly.

**REFERENCES:** The list of the articles cited in the paper that provide information on the research topic and the methods used.

November 25  
Jenny Watling  
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The second is a guided tour of a paper from the journal *Plant Physiology* (the original article is appended at the back of the PDF). This case study walks the students through the paper, from start to finish, with questions to prompt deeper understanding. You can download this resource here: <http://journalaccess.aspb.org/CaseStudy/>

## Case study: Reading a Primary Research Article from *Plant Physiology*

This case study examines a recent article published in the journal *Plant Physiology*. The full article is appended to this PDF. Because of space constraints, only the major points from the paper are covered in the case study, and the biochemical pathway is presented in simplified form.

**Title** → **The *b* Gene of Pea Encodes a Defective Flavonoid 3',5'-Hydroxylase, and Confers Pink Flower Color** [1][W][OA]

**Authors and author information** → **Carol Moreau, Mike J. Ambrose, Lynda Turner, Lionel Hill, T.H. Noel Ellis, and Julie M.L. Hoyer\***  
Department of Metabolic Biology (C.M., L.H.) and Department of Crop Genetics (M.J.A., L.T.), John Innes Centre, Norwich NR4 7UH, United Kingdom; and Institute of Biological, Environmental, and Rural Sciences, Aberystwyth University, Gogerddan Campus, Aberystwyth, Ceredigion SY23 3EB, United Kingdom (T.H.N.E., J.M.L.H.)

**Abstract: A summary written by the authors** → 

The inheritance of flower color in pea (*Pisum sativum*) has been studied for more than a century, but many of the genes corresponding to these classical loci remain unidentified. Anthocyanins are the main flower pigments in pea. These are generated via the flavonoid biosynthetic pathway, which has been studied in detail and is well conserved among higher plants. A previous proposal that the *Cleistanthus* (*cl*) gene of pea controls hydroxylation at the 5' position of the B ring of flavonoid precursors of the anthocyanins suggested to us that the gene encoding flavonoid 3',5'-hydroxylase (*F3'5'H*), the enzyme that hydroxylates the 5' position of the B ring, was a good candidate for *cl*. In order to test this hypothesis, we screened mutants generated by fast neutron bombardment. We found albino, pink-flowered *b* mutant lines that carried a number of lesions in an *F3'5'H* gene, including complete gene deletions. The *b* mutants lacked glycosylated delphinidin and cyanidin, the major pigments present in the progenitor purple-flowered wild-type pea. These results, combined with the finding that the *F3'5'H* gene cosegregates with *b* in a genetic mapping population, strongly support our hypothesis that the *b* gene of pea corresponds to a *F3'5'H* gene. The molecular characterization of genes involved in pigmentation in pea provides valuable anchor markers for comparative legume genomics and will help to identify differences in anthocyanin biosynthesis that lead to variation in pigmentation among legume species.

**Introduction: Not all journals mark it with a subheading** → 

Flavonoids are a large class of polyphenolic secondary metabolites that are involved in pigmentation, defense, fertility, and signaling in plants (Grotewold, 2006). Their basic skeleton consists of two six-carbon aromatic rings, A and B, connected by ring C, a three-carbon oxygenated heterocycle. Flavonoids are divided into different subclasses according to the oxidation state of the C ring, and compounds within each subclass are characterized by modifications such as hydroxylation, methylation, glycosylation, and acylation. Anthocyanins, for example, the major water-soluble pigments in flowers, have a fully unsaturated C ring and are usually glycosylated at position 3. Two important determinants of flower color are the cytochrome P450 enzymes

**Footnotes, including contact information for corresponding author and funding sources** → 

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**Citation for this paper** → 

**The first page of a typical article from *Plant Physiology*. (See text for more information about each section)**

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