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TRACKING TRENDS & PERFORMANCE IN BASIC RESEARCH

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2008 : August - Fast Breaking Papers : Claus Wasternack

FAST BREAKING PAPERS - 2008

August 2008



Claus Wasternack talks with *ScienceWatch.com* and answers a few questions about this month's Fast Breaking Paper in the field of Plant & Animal Science. The author has also sent along images of their work.



Article Title: Jasmonates: An update on biosynthesis, signal transduction and action in plant stress response, growth and development

Authors: Wasternack, C

Journal: ANN BOT

Volume: 100

Issue: 4

Page: 681-697

Year: OCT 2007

* Leibniz Inst Plant Biochem, Dept Nat Prod Biotechnol, Weinberg 3, D-06120 Halle, Saale, Germany.

(addresses have been truncated)

SW: Why do you think your paper is highly cited?

This is an invited review on recent aspects of biosynthesis, signal transduction, and the action of jasmonates (JAs) in plant stress responses, growth, and development. JAs became an exponentially growing interest during the last decade due to their role as important signal in plant responses to biotic and abiotic stress, and also in hormone regulating developmental processes such as root growth, tuber formation, and flower development.

There is a large scientific community interested in news related to the field of JAs, which regulate plant root growth, pollen fertility, wounding and healing, and defense against pathogens and insects. Due to a remarkable crosstalk between signaling pathways of JAs and other plant hormones such as ethylene, salicylate, or abscisic acid, readers need to have a concise update on biosynthesis and the action of JAs.

Furthermore, after appearance of the review in *Annals of Botany*, a breakthrough in JA research was published on a new protein family active in a protein complex with the F-box protein CO11 showing putative JA receptor function. This breakthrough was published by several groups worldwide and all of them took the review mentioned above as the most recent overview.

SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

The review gives a concise overview on JAs. Although distinct aspects of Jas are frequently reviewed, the *Annals of Botany* review summarizes news on the lipoxygenase pathways where JA biosynthesis is one branch, on JA

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2008 : August - Fast Breaking Papers : Claus Wasternack - Figures & Descriptions

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Figures and descriptions:

Figure 1:

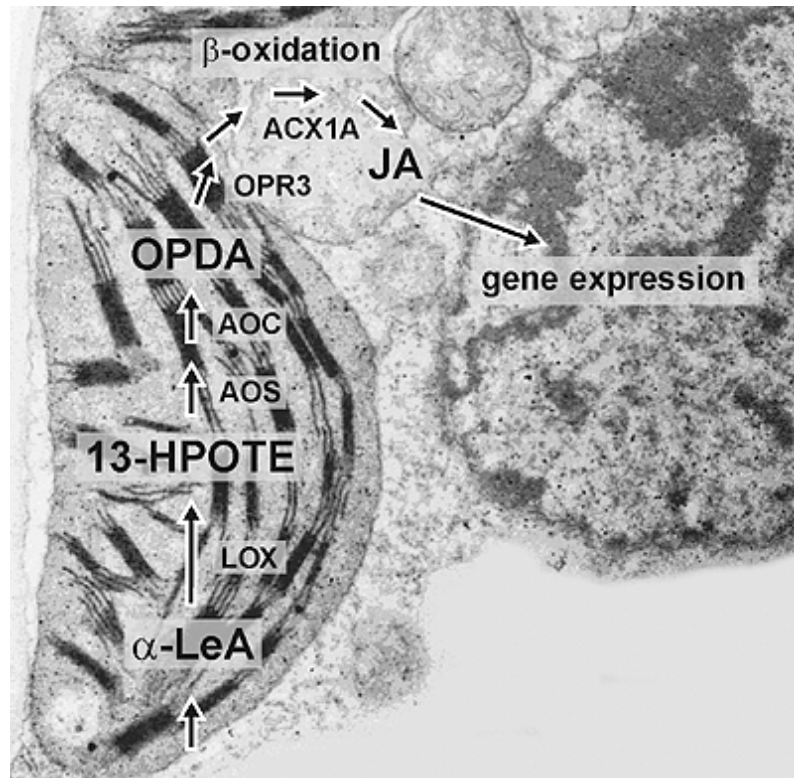


Figure 1:

Biosynthesis, intracellular location and action of jasmonate biosynthesis illustrated on a transmission electron micrograph of a barley mesophyll cell showing the associated cellular compartments, the chloroplast, the peroxisome and the nucleus (α -LeA: α -linolenic acid; LOX: lipoxygenase; 13-HPOTE: 13-hydroperoxy-octadecatrienoic acid; AOS: allene oxide synthase; AOC: allene oxide cyclase; OPDA: 12-oxophytodienoic acid; OPR3: OPDA reductase3; ACX1A: acyl CoA oxidase 1A; JA: jasmonic acid) (photo: B. Hause) (C. Wasternack, *Ann. of Bot.* **100**: 691-697, 2007).

Figure 2:

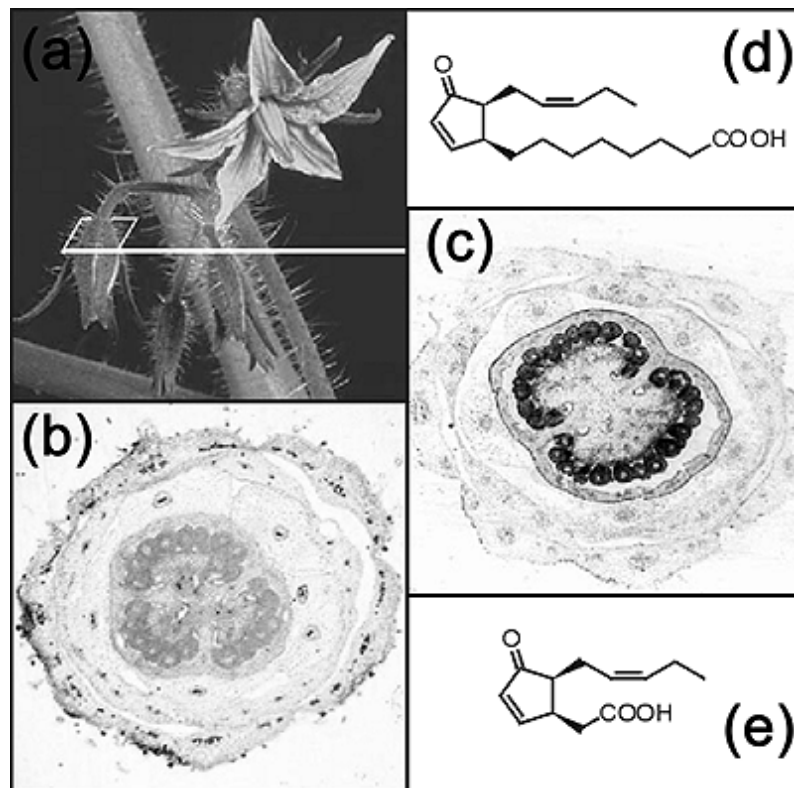


Figure 2:

Within jasmonate biosynthesis, the correct enantiomeric structure of the cyclopentanone ring of jasmonate is established by the allene oxide cyclase (AOC), which is encoded by a single copy gene in tomato. The first AOC was cloned from tomato by the Halle group in 2000. AOC is preferentially expressed in ovules of tomato flower buds. (a) tomato flower and tomato flower bud, (b) cross-section of a tomato flower bud showing AOC promoter activity by GUS staining, (c) cross-section of a tomato flower bud showing immunocytochemical detection of AOC protein (black staining), (d) structure of 12-oxo-phytodienoic acid, the precursor of jasmonic acid; (e) structure of jasmonic acid in the more stable (-)-form (C. Wasternack, *Ann. of Bot.* **100**: 681-697, 2007).

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