

# **JAN ADELIN SMALLE**

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**Department of Plant and Soil Sciences**  
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## **EDUCATION**

B.S. 1983-1987, Ghent University (Belgium), Plant Biotechnology

Ph.D. 1991-1998, Ghent University (Belgium), Plant Genetics  
Academic Advisor: Dr. Dominique Van Der Straeten

## **ACADEMIC APPOINTMENTS**

1988–1989: Research Assistant, Laboratory of Genetics, Ghent University, Ghent, Belgium.

1989–1991: Visiting Fellow, Department of Molecular Biology, Harvard University, Boston, MA.

1991–1998: Research Assistant, Laboratory of Genetics, Ghent University, Ghent, Belgium.

1998–2004: Research Associate with Dr. Richard Vierstra, Laboratory of Genetics, University of Wisconsin-Madison, Madison, WI.

2004-2010: Assistant Professor, Department of Plant and Soil Sciences, University of Kentucky, Lexington, KY.

2010: Associate Professor, Department of Plant and Soil Sciences, University of Kentucky, Lexington, KY.

## **TEACHING**

Two courses in the College of Agriculture at the University of Kentucky:

- 1) Fall semester of each year: PLS210 “The Life Processes of Plants” for undergraduate students. A 3-credit course on photosynthesis, respiration, transport systems and developmental regulation.
- 2) Spring semester of each year: PLS623 “Physiology of Plants I” for graduate students. A 3-credit course on plant hormone regulation.

## **RESEARCH TOPICS**

- Plant hormone regulation.
- Regulation of protein degradation in plant cells.
- Nanoparticle plant interactions.

## BIBLIOGRAPHY OF PUBLICATIONS

### Peer-reviewed (39)

1. T. E. Shull, J. Kurepa and J. Smalle (2016). Cytokinin signaling promotes differential stability of type-B ARR<sub>s</sub>. *Plant Signaling & Behavior* 11(4).
2. J. Kurepa, Y. Li and J. Smalle (2014). Cytokinin signaling stabilizes the response activator ARR1. *The Plant Journal* 78, 157-168.
3. J. Kurepa, Y. Li, S.E. Perry and J. Smalle (2014). Ectopic expression of the phosphomimic mutant version of Arabidopsis response regulator 1 promotes a constitutive cytokinin response phenotype. *BMC Plant Biology* 14: 28.
4. J. Kurepa, R. Nakabayashi, T. Paunesku, M. Suzuki, K. Saito, G.E. Woloschak and J. Smalle (2014). Direct isolation of flavonoids from plants using ultra-small anatase TiO<sub>2</sub> nanoparticles. *The Plant Journal* 77, 443-453.
5. C.A. Falaschetti, T. Paunesku, J. Kurepa, D. Nanavati, S.S. Chou, M. De, M. Song, J.T. Jang, A. Wu, V.P. Dravid, J. Cheon, J. Smalle and G.E. Woloschak (2013). Negatively Charged Metal Oxide Nanoparticles Interact with the 20S Proteasome and Differentially Modulate Its Biologic Functional Effects. *ACS Nano* 7, 7759–7772.
6. J. Kurepa, Y. Li and J. Smalle (2013). Reversion of the Arabidopsis *rpn12a-1* exon-trap mutation by an intragenic suppressor that weakens the chimeric 5' splice site (2013). *F1000Research* 2:60.
7. J. Kurepa, Y. Li and J. Smalle (2013). Proteasome-dependent proteolysis has a critical role in fine-tuning the feedback inhibition of cytokinin signaling. *Plant Signaling & Behavior* 8 (3).
8. Y. Li, J. Kurepa and J. Smalle (2013). AXR1 promotes the cytokinin response by facilitating ARR5 proteolysis. *The Plant Journal* 74, 13-24.
9. Q. Zhu, J. Dugardeyn, C. Zhang, M. Takenaka, K. Kühn, C. Craddock, **J. Smalle**, M. Karampelias, J. Denecke, J. Peters, T. Gerats, A. Brennicke, P. Eastmond, E.H. Meyer and D. Van Der Straeten (2012). SLO2, a mitochondrial pentatricopeptide repeat protein affecting several RNA editing sites, is required for energy metabolism. *The Plant Journal* 71, 836-849.
10. S. Wang, J. Kurepa, T. Hashimoto and **J. Smalle** (2011). Salt stress-induced disassembly of Arabidopsis cortical microtubule arrays involves 26S proteasome-dependent degradation of SPIRAL1. *The Plant Cell* 23, 3412-3427.
11. J. Kurepa and **J. Smalle** (2011). Assaying transcription factor stability. *Methods Mol Biol.* 754, 219-234.
12. S. Wang, J. Kurepa and **J. Smalle** (2011). Ultra-small TiO<sub>2</sub> nanoparticles disrupt microtubular networks in Arabidopsis thaliana. *Plant Cell Environ.* 34, 811-820.

13. J. Kurepa, T. Paunesku, S. Vogt, H. Arora, B.M. Rabatic, J. Lu, M.B. Wanzer, G.E. Woloschak and **J. Smalle** (2010). Uptake and distribution of ultra-small anatase TiO<sub>2</sub> Alizarin red S nanoconjugates in *Arabidopsis thaliana*. **Nano Letters** 10, 2296-2302.
14. J. Kurepa, C. Karangwa, L. Sfichi Duke and **J. Smalle** (2010). Arabidopsis sensitivity to protein synthesis inhibitors depends on 26S proteasome activity. **Plant Cell Reports** 29, 249-259.
15. S. Wang, J. Kurepa and **J. Smalle** (2009). Arabidopsis RPN1a is a non-essential 26S proteasome subunit isoform required for optimal plant growth and stress responses. **Plant & Cell Physiology** 50, 1721-1725.
16. J. Kurepa, S. Wang, Y. Li, D. Zaitlin, A. J. Pierce and **J. Smalle** (2009). Loss of 26S proteasome function leads to increased cell size and decreased cell number in Arabidopsis shoot organs. **Plant Physiology** 150, 178-189.
17. A. J. Book, **J. Smalle**, K. Lee, P. Yang, J. M. Walker, S. Casper, J. H. Holmes, L. A. Russo, Z. W. Buzzinotti, P. D. Jenik and R. D. Vierstra (2009). The RPN5 subunit of the 26S proteasome is essential for gametogenesis, sporophyte development, and complex assembly in Arabidopsis. **The Plant Cell**. 21, 460-471.
18. J. Kurepa, A. Toh-e and **J. Smalle** (2008). 26S proteasome regulatory particle mutants have increased oxidative stress tolerance. **The Plant Journal**. 53, 102-114.
19. J. Kurepa and **J. Smalle** (2008). Structure, function and regulation of plant proteasomes. **Biochimie**. 90, 324-335.
20. P. Yang, **J. Smalle**, S. Lee, N. Yan, T. J. Emborg and R. D. Vierstra (2007). Ubiquitin C-terminal hydrolases 1 and 2 affect shoot architecture in Arabidopsis. **The Plant Journal**. 51, 441-457.
21. A. De Paepe, L. De Grauwe, S. Bertrand, **J. Smalle** and D. Van Der Straeten (2005). The *Arabidopsis* mutant *eer2* has enhanced ethylene responses in the light. **Journal of Experimental Botany** 56, 2409-2420.
22. J. M. Gagne, **J. Smalle**, D. Gingrich, J.M. Walker, S. Yoo, S. Yanagisawa and R. D. Vierstra (2004). The *Arabidopsis* F-box proteins EBF1 and 2 form SCF E3s that repress ethylene action and promote growth by directing EIN3 degradation. **Proceedings of the National Academy of Sciences of the USA** 101, 6803-6808.
23. P. Yang, H. Fu, J. Walker, C.M. Papa, **J. Smalle**, Y. Ju and R.D. Vierstra (2004). Purification of the Arabidopsis 26S proteasome: biochemical and molecular analyses revealed the presence of multiple isoforms. **Journal of Biological Chemistry** 279, 6401-6413.
24. F. Vandenbussche, W. H. Vriezen, **J. Smalle**, L.J.J. Laarhoven, F.J.M. Harren and D. Van Der Straeten (2003). Ethylene and auxin control the Arabidopsis response to decreased light intensity. **Plant Physiology** 133, 517-527.
25. **J. Smalle**, J. Kurepa, P. Yang, T. Emborg, E. Babychuk, S. Kushnir and R. D. Vierstra (2003). The pleiotropic role of the 26S proteasome subunit RPN10 in *Arabidopsis thaliana*

growth and development supports a substrate-specific function in abscisic acid signaling. ***The Plant Cell*** 15, 965-980.

26. J. Kurepa, J. M. Walker, **J. Smalle**, M. M. Gosink, S. J. Davis, T. L. Durham, D. Sung and R. D. Vierstra (2003). The SUMO protein modification system in *Arabidopsis*: accumulation of SUMO1 and SUMO2 conjugates is increased by stress. ***Journal of Biological Chemistry*** 278, 6862-6872.
27. F. Vandenbusche, **J. Smalle**, J. Le, N. Jose Madiera Saibo, A. De Paepe, L. Chaerle, O. Tietz, R. Smets, L. J. J. Laarhoven, F. J. M. Harren, H. Van Onckelen, K. Palme, J. Verbelen and D. Van Der Straeten (2003). The *Arabidopsis thaliana* mutant *alh1* illustrates a cross-talk between ethylene and auxin. ***Plant Physiology*** 131, 1228-1238.
28. **J. Smalle**, J. Kurepa, P. Yang, E. Babiychuk, S. Kushnir, A. Durski and R. D. Vierstra (2002). Cytokinin growth responses in *Arabidopsis thaliana* involve the 26S proteasome subunit RPN12. ***The Plant Cell*** 14, 17-32.
29. **J. Smalle**, M. Haegman, J. Mertens, J. Vangronsveld, M. Van Montagu and D. Van Der Straeten (1999). The expression pattern of the Arabidopsis ACC synthase gene 1 during rosette development. ***Journal of Experimental Botany*** 50, 1561-1566.
30. **J. Smalle**, J. Kurepa, M. Haegman, J. Gielen, M. Van Montagu and D. Van Der Straeten (1998). The trihelix-binding motif in higher plants is not restricted to the transcription factors GT-1 and GT-2. ***Proceedings of the National Academy of Sciences of the USA*** 95, 3318-3322.
31. J. Kurepa, **J. Smalle**, M. Van Montagu and D. Inzé (1998). Effects of sucrose supply on growth and paraquat tolerance of the late-flowering *gi-3* mutant. ***Plant Growth Regulation*** 26, 91-96.
32. J. Kurepa, **J. Smalle**, M. Van Montagu and D. Inzé (1998). Polyamines and paraquat toxicity in *Arabidopsis*. ***Plant and Cell Physiology*** 39, 987-992.
33. J. Kurepa, **J. Smalle**, M. Van Montagu and D. Inzé (1998). Oxidative stress tolerance and longevity in *Arabidopsis*: the late-flowering mutant *gigantea* is tolerant to paraquat. ***The Plant Journal*** 14, 759-764.
34. **J. Smalle**, M. Haegman, J. Kurepa, M. Van Montagu and D. Van Der Straeten (1997). Ethylene can stimulate Arabidopsis hypocotyl elongation in the light. ***Proceedings of the National Academy of Sciences of the USA*** 94, 2756-2761.
35. D. A. Wright, N. Ke, **J. Smalle**, B. Hauge, H. M. Goodman and D. F. Voytas (1996). Multiple non-LTR retrotransposons in the genome of *Arabidopsis thaliana*. ***Genetics*** 142, 569-578.
36. C. Valon, **J. Smalle**, H. M. Goodman and J. Giraudat (1993). Characterization of an *Arabidopsis thaliana* gene (TMKL1) encoding a putative transmembrane protein with an unusual kinase-like domain. ***Plant Molecular Biology*** 23, 415-421.
37. D. Van Der Straeten, A. Djudzman, W. Van Caeneghem, **J. Smalle** and M. Van Montagu (1993). Genetic and physiological analysis of a new locus in *Arabidopsis* that confers

resistance to 1-aminocyclopropane-1-carboxylic acid and ethylene and specifically affects the ethylene signal transduction pathway. *Plant Physiology* 102, 401-408.

38. J. Giraudat, B. M. Hauge, C. Valon, **J. Smalle**, F. Parcy and H. M. Goodman (1992). Isolation of the *Arabidopsis ABI3* gene by positional cloning. *The Plant Cell* 4, 1251-1261.
39. B. Claes, **J. Smalle**, R. Dekeyser, M. Van Montagu and A. Caplan (1991). Organ-dependent regulation of a plant promoter isolated from rice by promoter-trapping in tobacco. *The Plant Journal* 1, 15-26.

### Reviews, Comments and Book Chapters (6)

1. J. Kurepa, S. Wang and **J. Smalle** (2012). The role of 26S proteasome-dependent proteolysis in the formation and restructuring of microtubule networks. *Plant Signaling & Behavior* 7, 1289-1295.
2. J. Kurepa, S. Wang, Y. Li and **J. Smalle** (2009). Proteasome regulation, plant growth and stress tolerance. *Plant Signaling & Behavior* 4, 924-927.
3. J. Kurepa and **J. Smalle** (2008). To misfold or to lose structure? Detection and degradation of oxidized proteins by the 20S proteasome. *Plant Signaling & Behavior*. 3, 418-419.
4. **J. Smalle** and R. D. Vierstra (2004). The ubiquitin/26S proteasome proteolytic pathway. *Annual Review of Plant Biology* 55, 555-590.
5. D. Van Der Straeten, **J. Smalle** and M. Van Montagu (1999). Ethylene. In: Encyclopedia of Molecular Biology, T.E. Creighton (Ed.). New York, Wiley & Sons.
6. **J. Smalle** and D. Van Der Straeten (1997). Ethylene and vegetative development. *Physiologia Plantarum* 100, 593-605.