

Concise Photochemical Synthesis of the Antimalarial Indole Alkaloid Decursivine

Mascal, M.; Modes, K.V.; Durmus, A. *Angew. Chem. Int. Ed.* **2011**, *50*, early view.

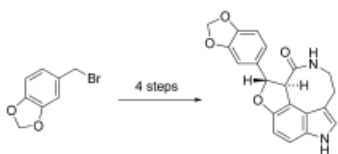
Protecting-Group-Free Total Synthesis of (E)- and (Z)-Alstoscholarine

Gerfaud, T.; Xie, C.; Neuville, L.; Zhu, J. *Angew. Chem. Int. Ed.* **2011**, *50*, 3954-3957.

Roxanne Atienza
Short Literature Presentation
April 18, 2011

Concise Photochemical Synthesis of the Antimalarial Indole Alkaloid Decursivine

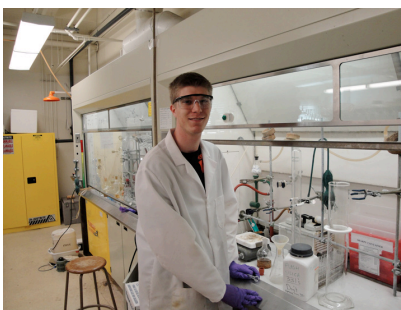
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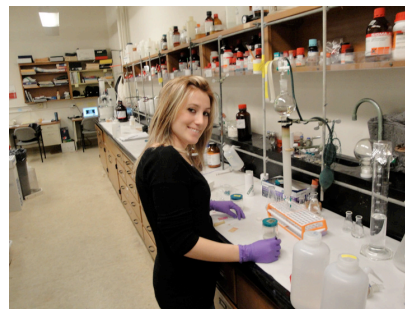
A four-step synthesis of the extracyclic, antimalarial indole natural product decursivine is described starting from commercial piperonyl bromide and serotonin (see scheme). A photoinitiated reaction cascade involving indole radical cation formation,

rearrangement, radical recombination, rearomatization, elimination, and diastereoselective auto-acid-catalyzed closure of the dihydrofuran ring combine in a single step to conclude this remarkably efficient synthesis.

Mark Mascall



Kyle Modes



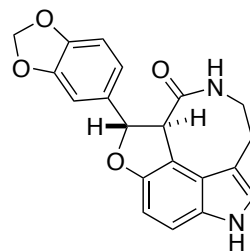
Asuman Durmus

PhD., University of London, Imperial College
Postdoctoral Fellow, University of Strasbourg, France
Lecturer, Loughborough University, UK
Lecturer, University of Nottingham, UK
Donald J. Cram Teacher-Scholar and Visiting Professor, UCLA
Appointed to faculty, UC Davis, 2003-present

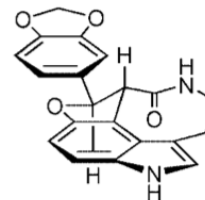
Decursivine



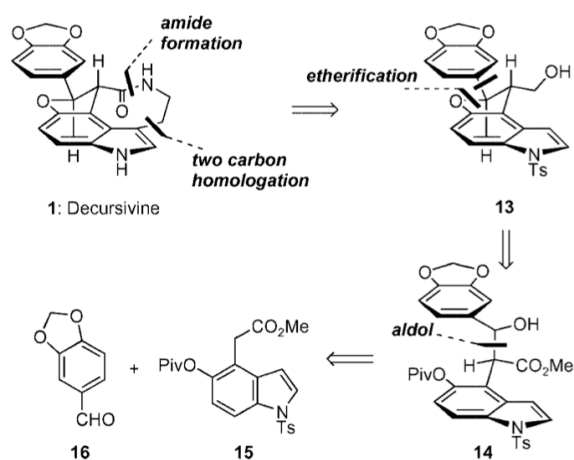
- isolated from *Rhabdophora decursiva*
- extracyclic indole alkaloid
- biological activity: 4.4 microg/mL against chloroquine-resistant malaria parasite *Plasmodium falciparum*



Decursivine

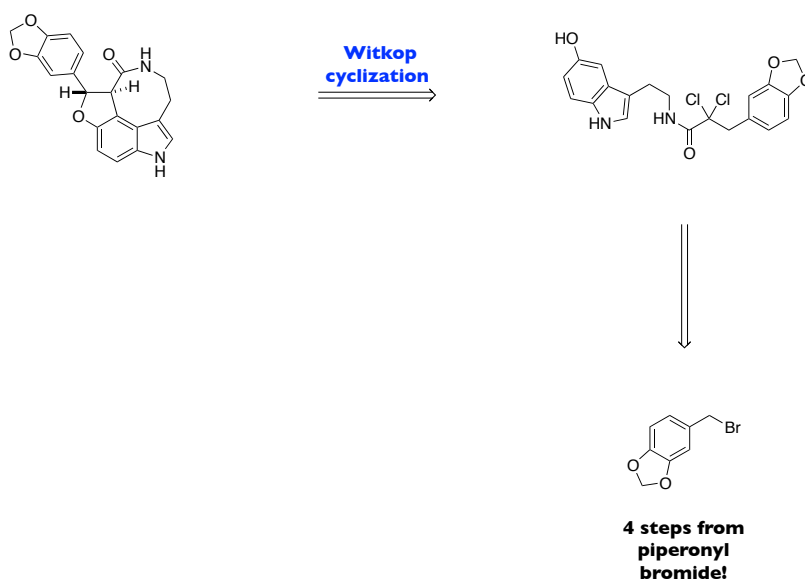


Previous Synthesis by Leduc and Kerr 2007

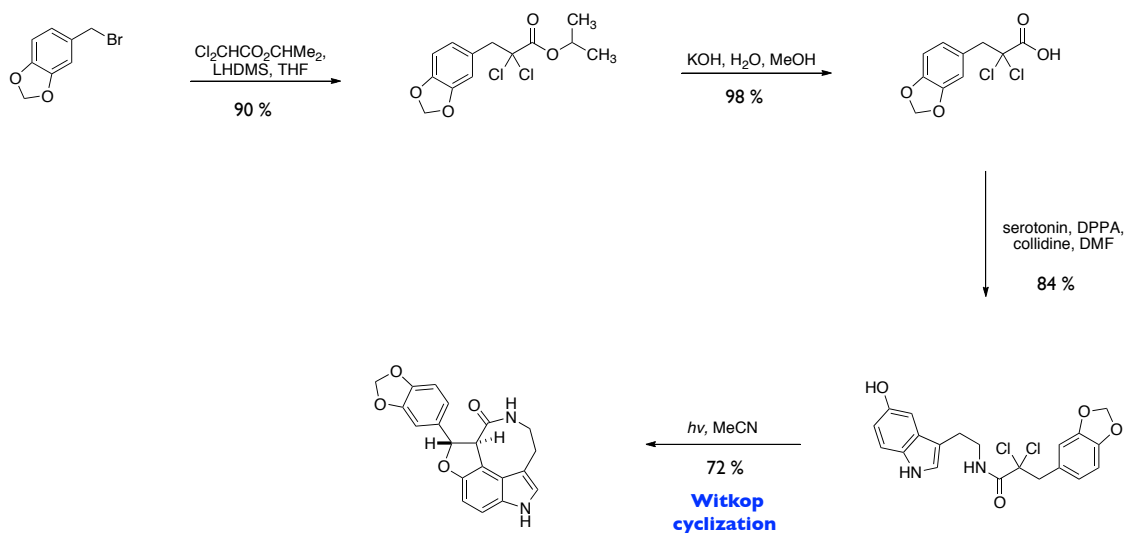


20 steps from *p*-aminophenol
3% overall yield

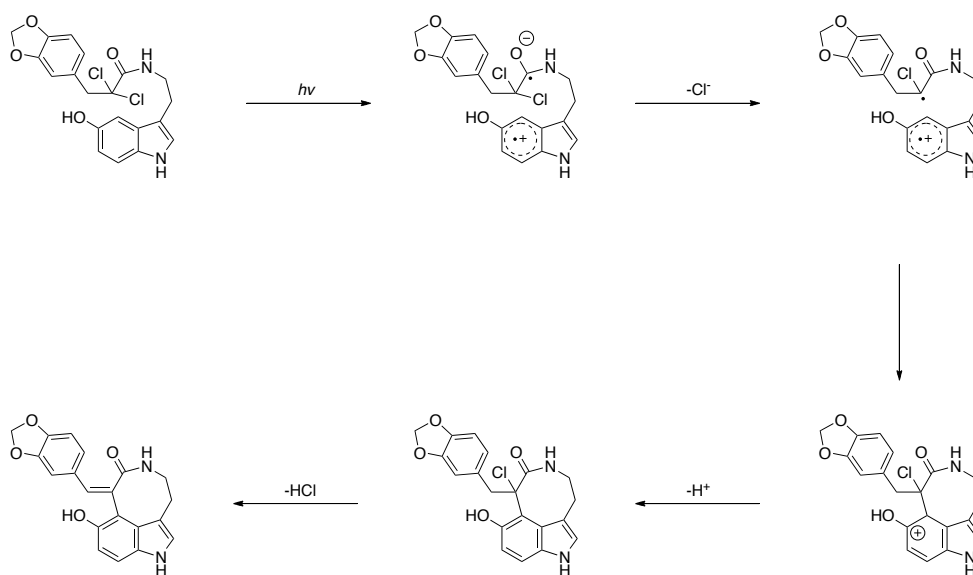
Mascal Retrosynthesis



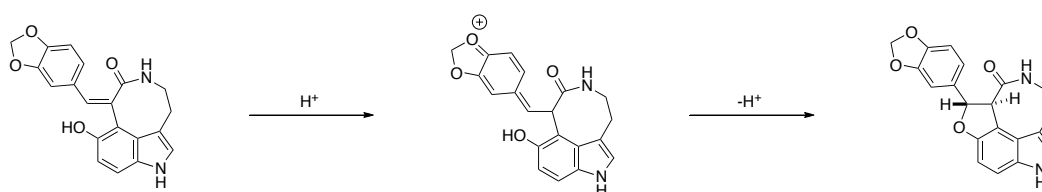
Forward Synthesis



Witkop Reaction

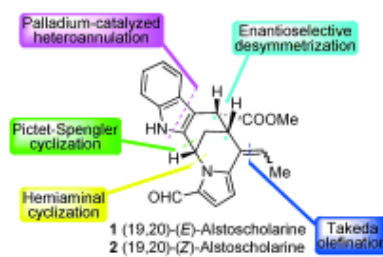


Formation of Decursivine



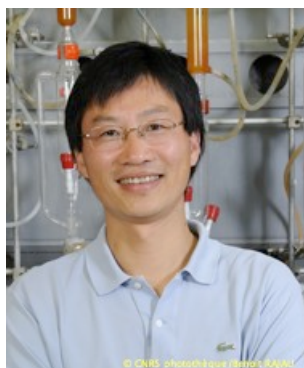
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Looking for hidden symmetry.

Jieping Zhu

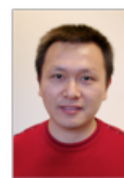


Jieping Zhu, Director of Research 1st class at CNRS and Full professor of organic chemistry at the Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

- Born in 1965 in Hangzhou, P. R. China
- B.Sc., Hanzhou Normal University in 1984
- M.Sc., Lanzhou University in 1987 (Prof. Y.-L. Li)
- Ph.D., Université Paris XI in 1991 (Prof. H.-P. Husson and Prof. J.-C. Quirion)
- Post-doct., Texas A & M University, USA (Prof. Sir D. H. R. Barton)



Thibaud Gerfaud



Chunsong Xie



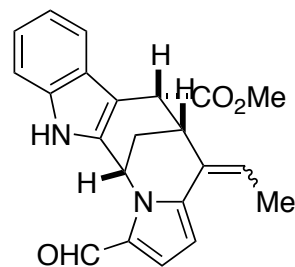
Luc Neuville



Awards

- CNRS bronze medal (1996)
- French Chemical Society SFC-Acros award (1999)
- AstraZeneca Award in Organic Chemistry (UK, 2002)
- Japan Society for Promotion of Science (JSPS) Senior research fellow (2002)
- Prix EMILE JUNGFLIEISCH of French Academy of Sciences (2003)
- National Science Foundation Outstanding Young Oversea Scientist award (China, 2003)
- Liebig Lectureship of the German Chemical Society (2004)
- Novartis Chemistry Lecture Award (Switzerland, 2008)
- CNRS silver medal (2009)
- Award of the Organic Chemistry Division of the French Chemical Society (DCO-SCF) (2010)

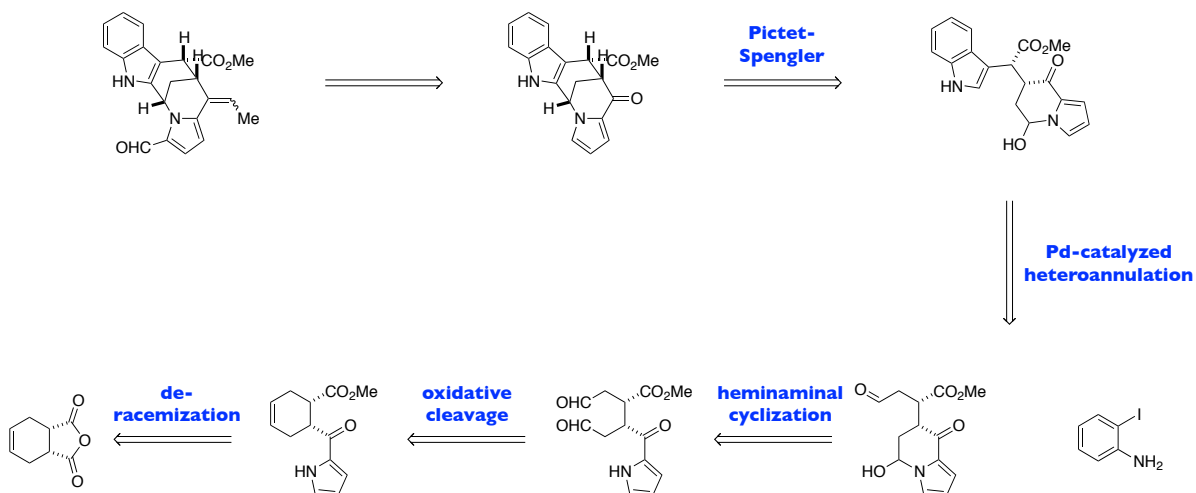
Alstoscholarine



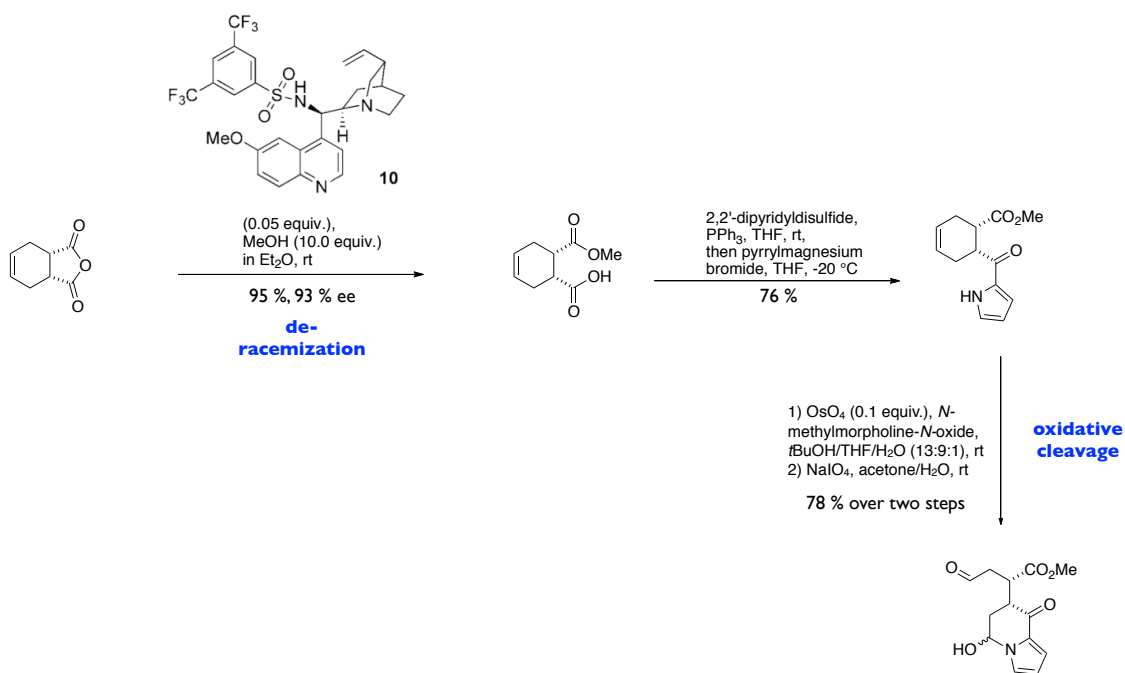
Alstoscholarine

- isolated from *Alstonia scholaris*, traditional medicinal plant in South Asia in 2007
 - pentacyclic structure
 - bridged [3.1.3] bicycle, fused indole ring and pyrrole ring
- no known biological activity to date

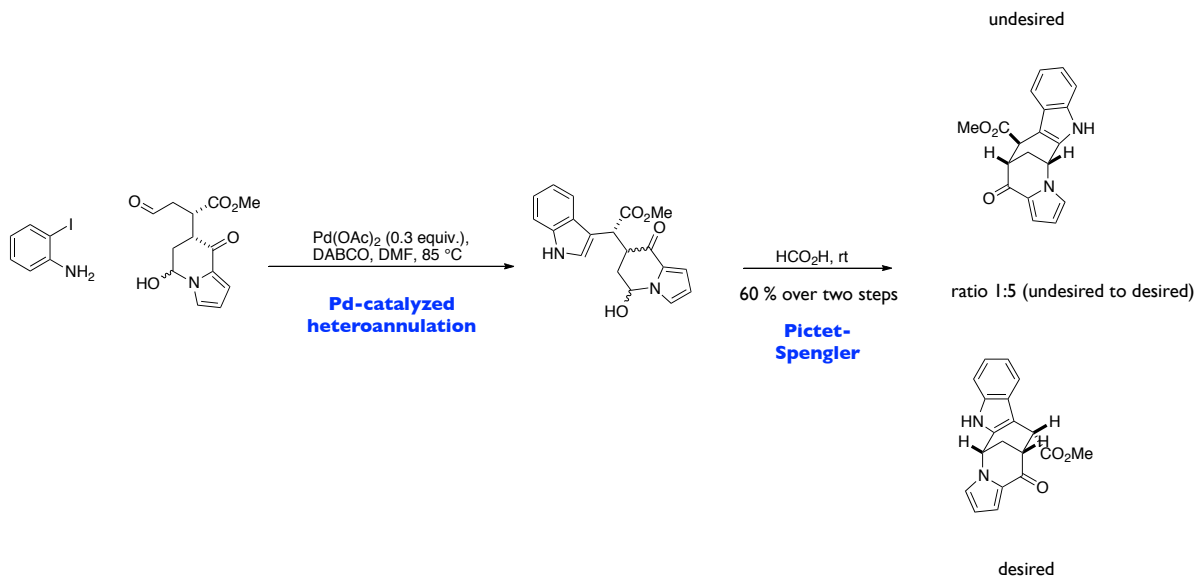
Retrosynthetic Breakdown



Forward Synthesis



Forward Synthesis



The End

