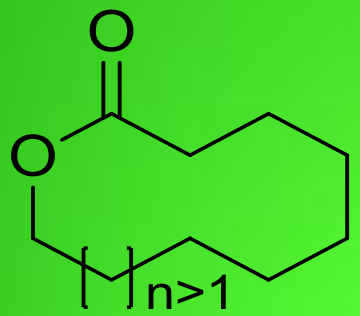
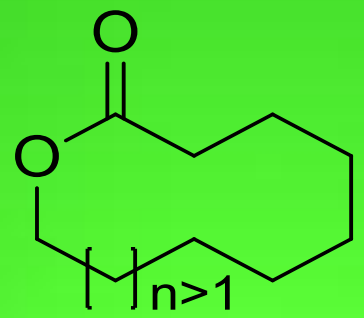
Makrozyklische Lactone



OC07 Vortrag
Tobias Brenner
David Nieder
Betreuer: Prof. J. Jauch

Inhaltsübersicht

1.Was sind makrozyklische Lactone?



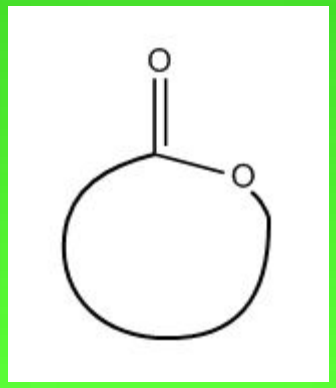
1. Was sind makrozyklische Lactone?

Einteilung von zyklischen Verbindungen nach der Ringgröße:

- kleine Ringe: 3- und 4-Ringe
- gewöhnliche Ringe: 5-,6- und 7-Ringe
- mittlere Ringe: 8 bis 11-Ringe
- große Ringe(makrozyklische Ringe): ab 12-Ring

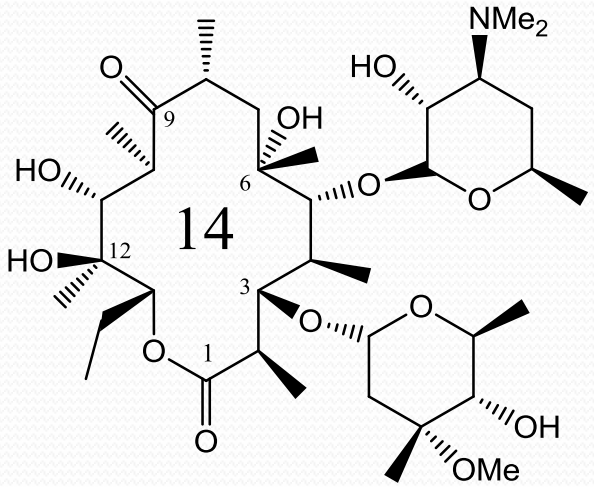
Im Allgemeinen: Makrozyklische Lactone(Macrolide) sind zyklische Ester mit mindestens 11 C-Atomen und 1- Sauerstoffatom

2. Überblick über Makrozyklische Lactone

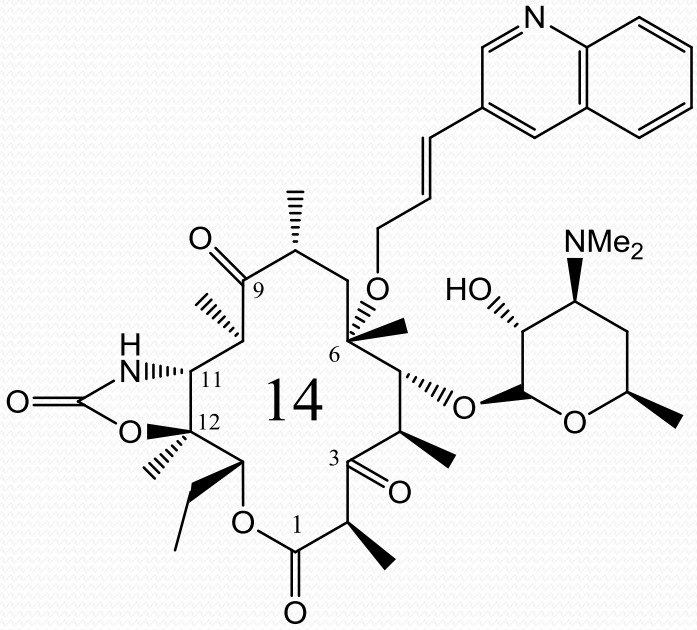


2.1 Antibiotika

- Erythromycin A

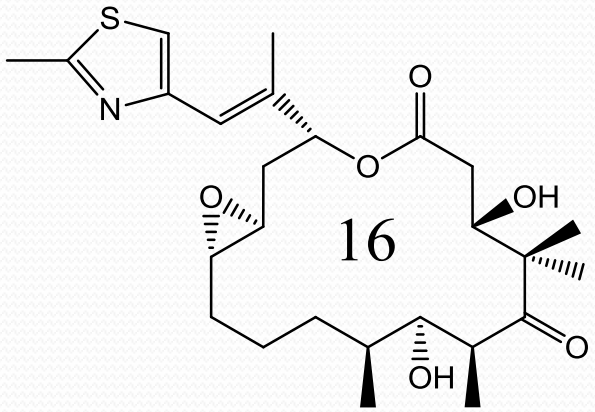


- Cethromycin

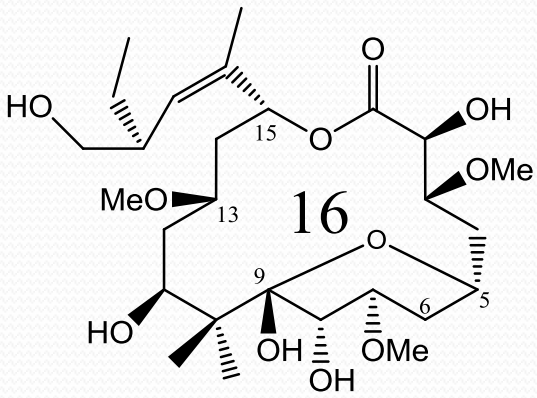


2.2 Cytostatika

- Epothilon A

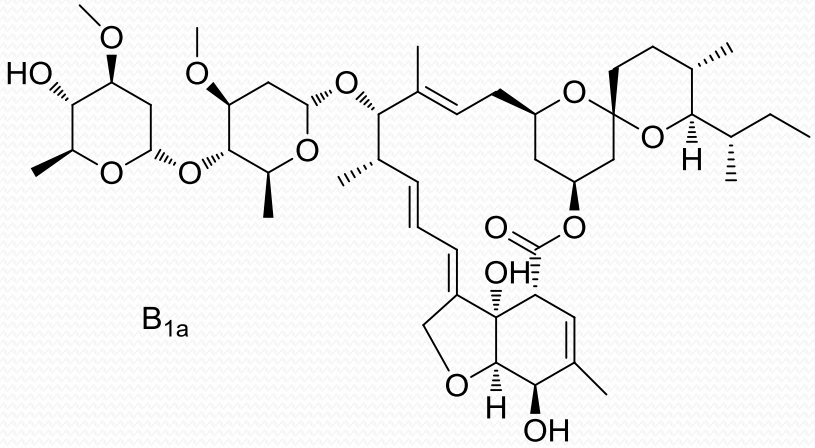


- Pelorusid A

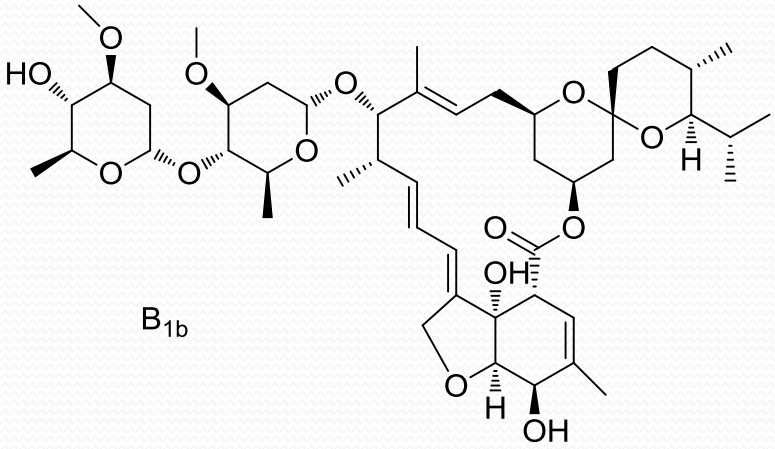


2.3Antiparasitika und Antimykotika

- Ivermectin

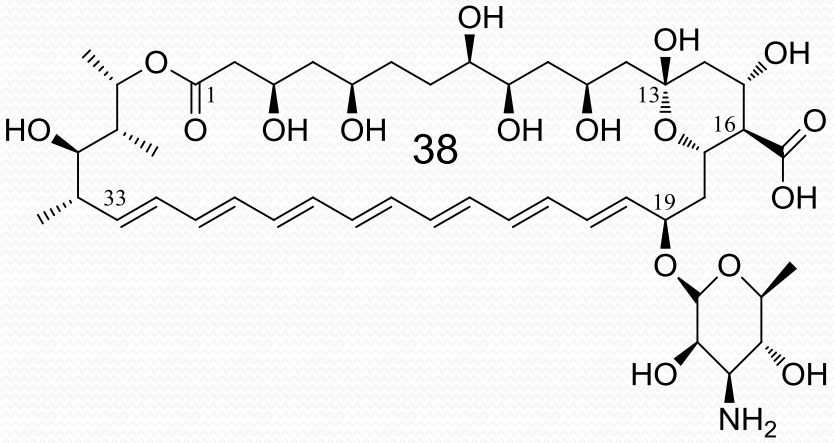


B_{1a}



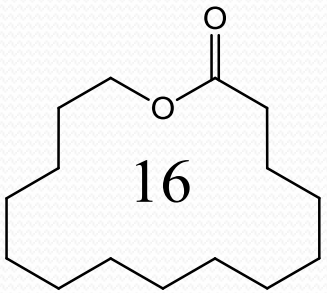
B_{1b}

- Amphotericin B

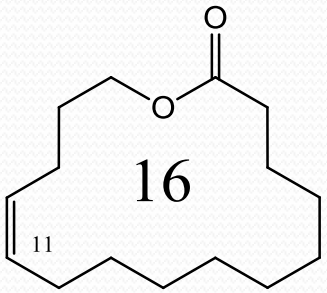


2.4 Riechstoffe

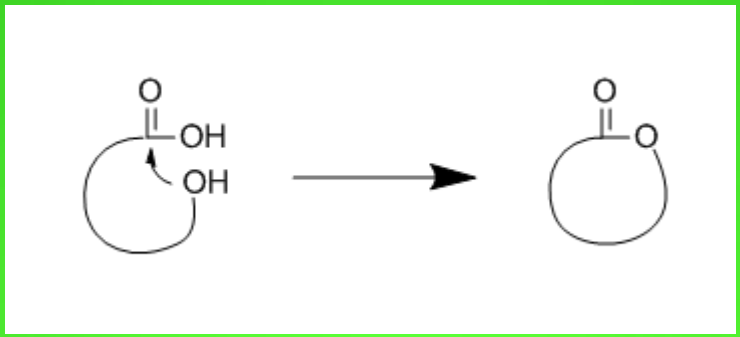
- Exatolid



- Habanolid

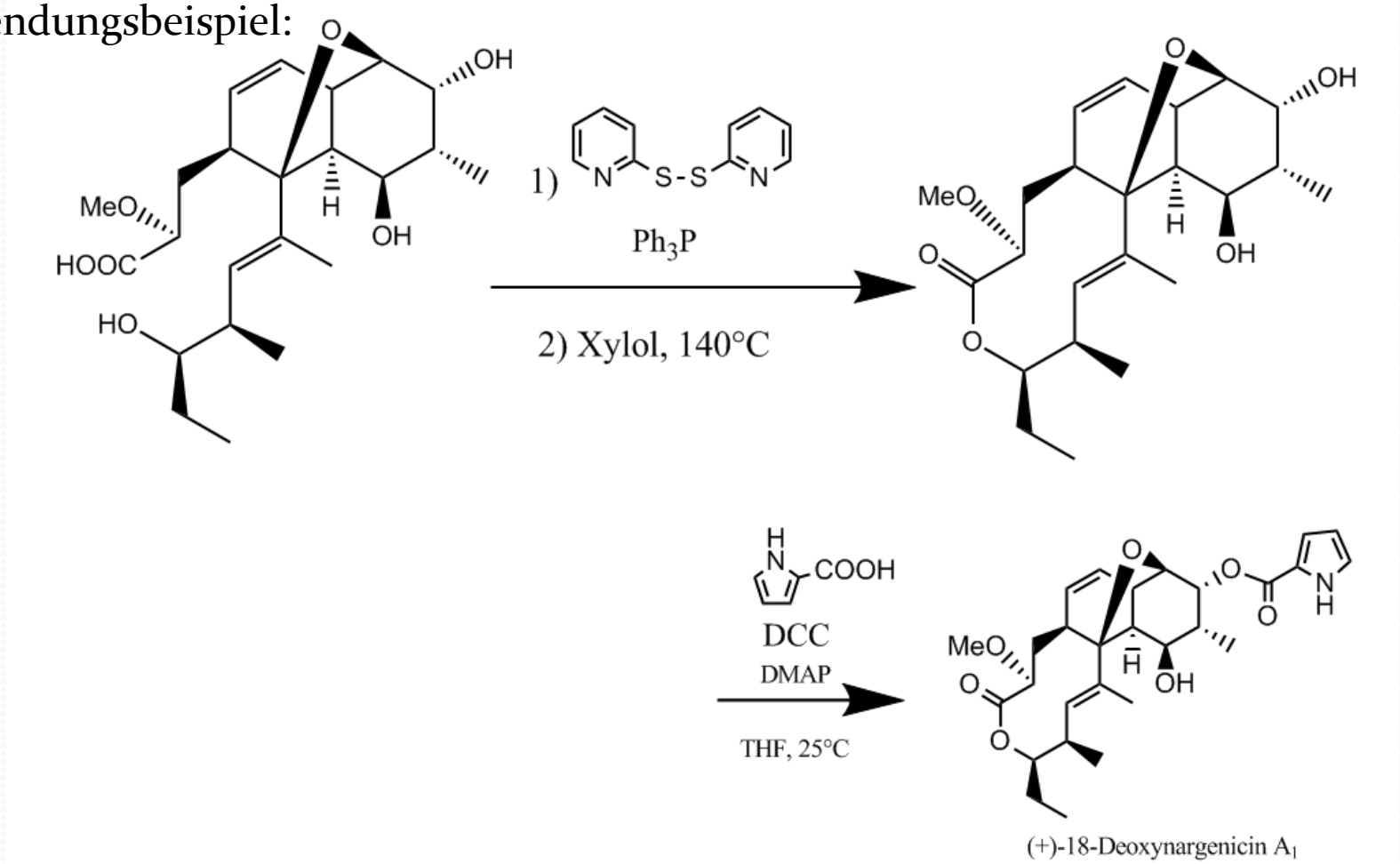


3. Makrolactonisierungsreaktionen



3.1 Corey-Nicolaou - Methode

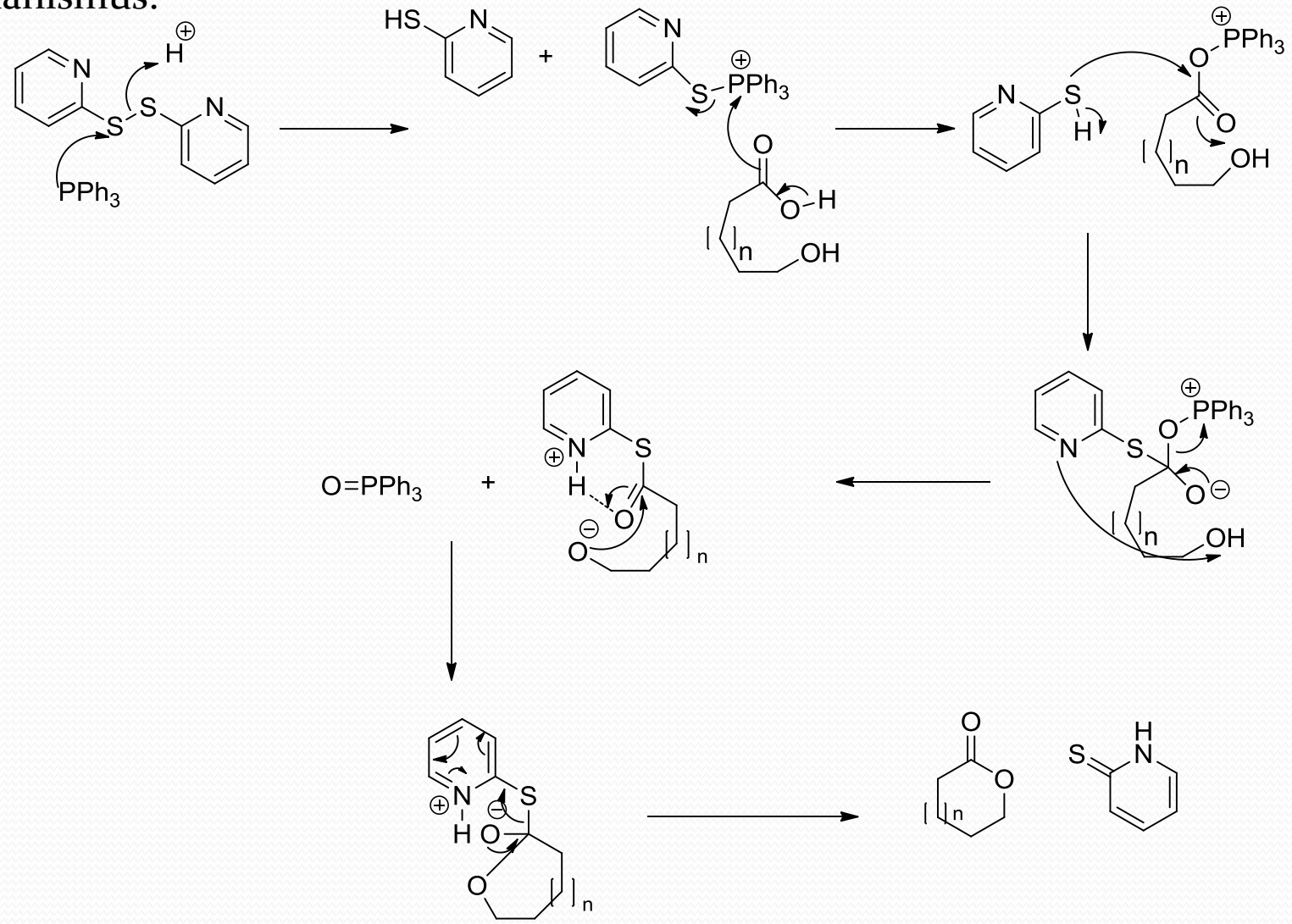
Anwendungsbeispiel:



D.J. Plata, J. Kallmerten, *J. Am. Chem. Soc.*, (**1988**), 110, 4041

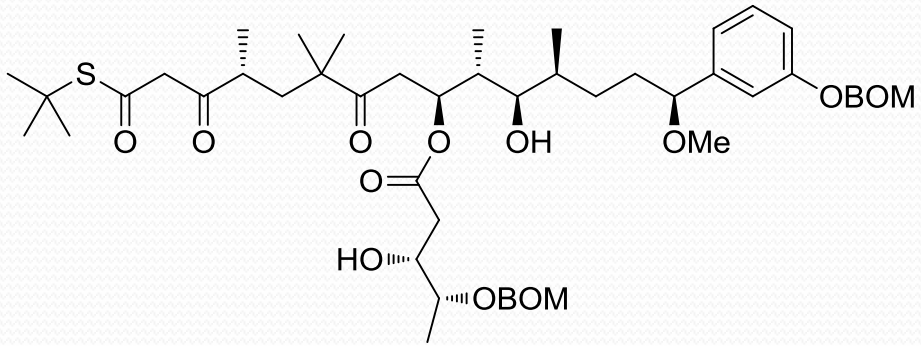
3.1 Corey-Nicolaou- Methode

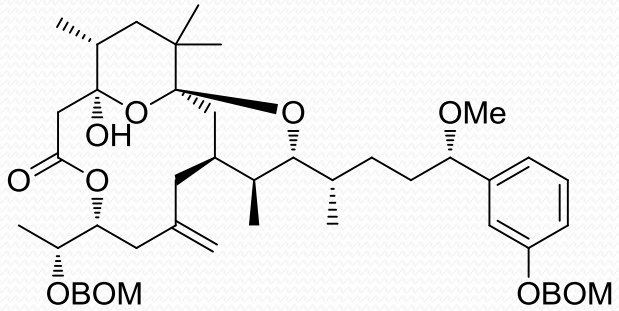
Mechanismus:

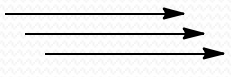


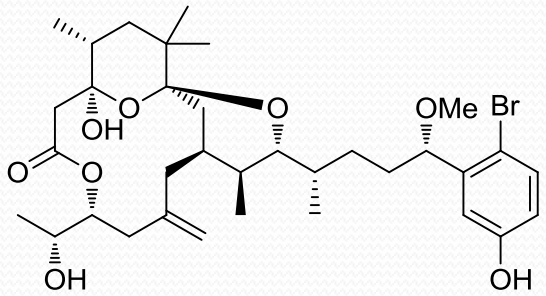
3.2 Masamune - Methode

Anwendungsbeispiel:







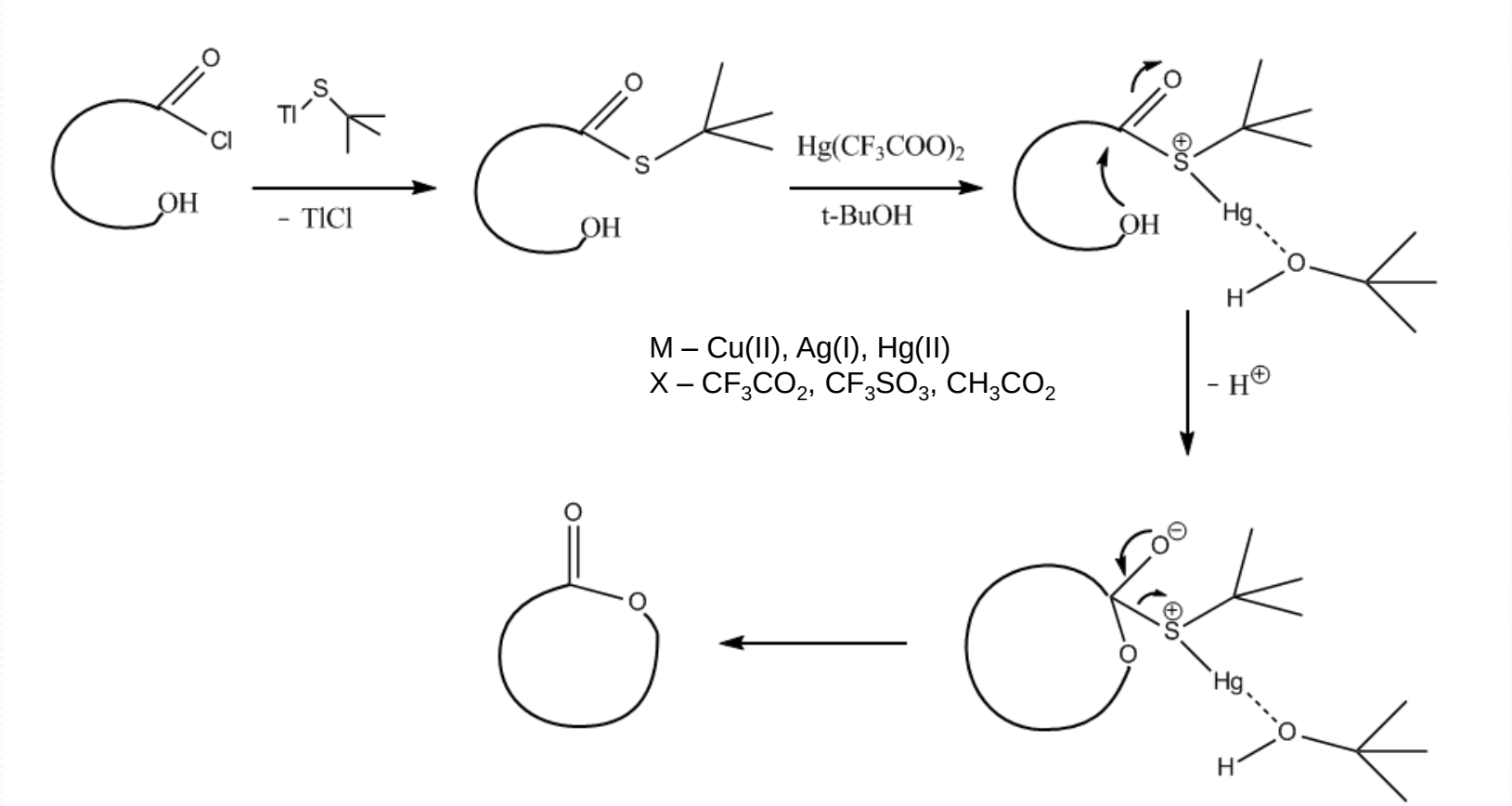


Aplysiatoxin

Park, P. U.; Broka, C. A.; Johnson, B. F.; Kishi, Y., *J. Am. Chem. Soc.* (**1987**), 109, 6205

3.2 Masamune - Methode

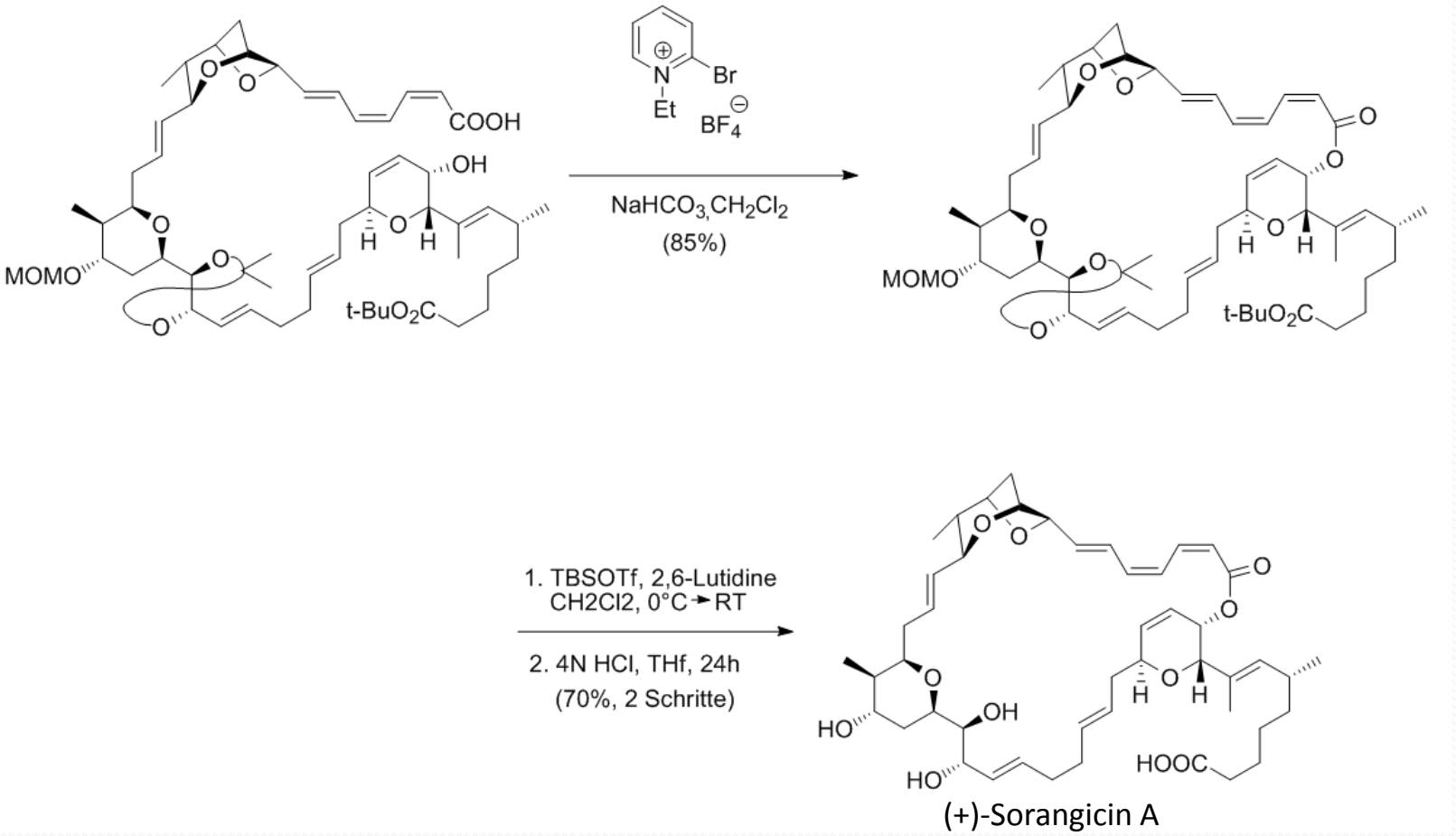
Mechanismus:



Masamune, S. et al., *J. Am. Chem. Soc.,* (**1975**), 97, 3512–3516

3.3 Mukaiyama-Methode

Anwendungsbeispiel:

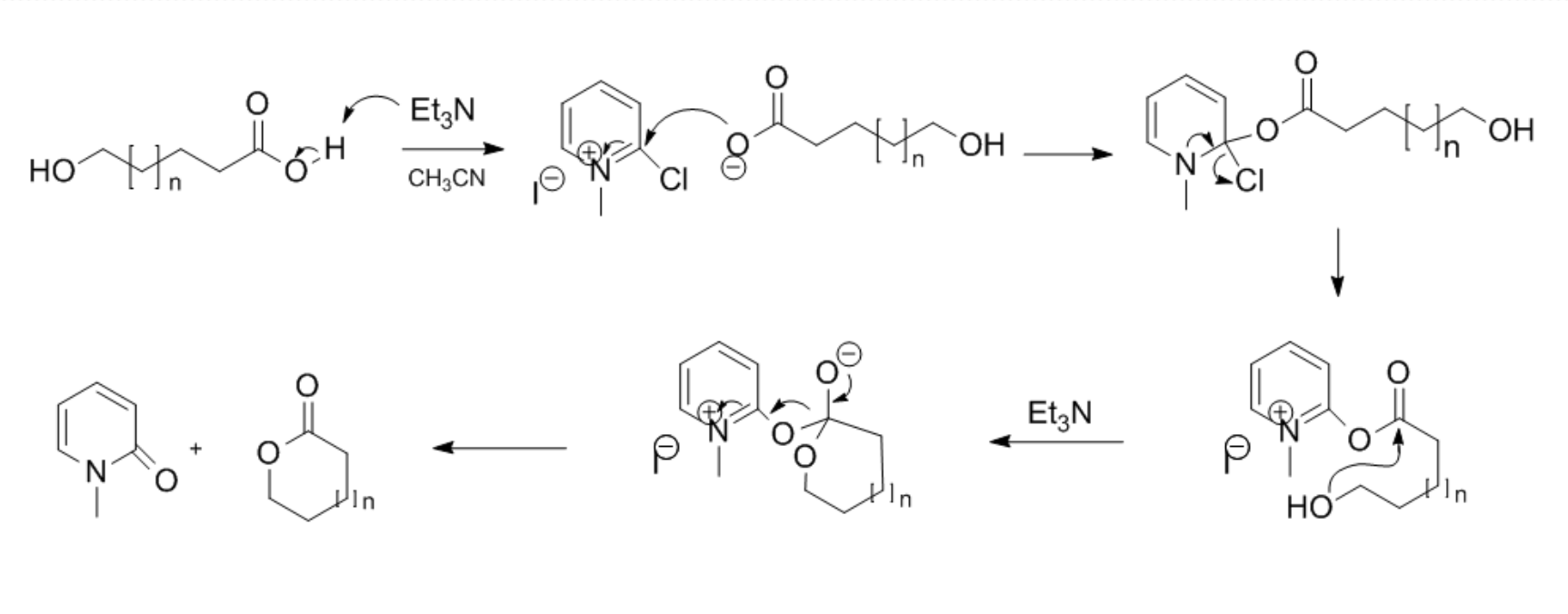


(+)-Sorangicin A

A.B. Smith et al., *J. Am. Chem. Soc., (***2009),** Vol. 131, No. 34

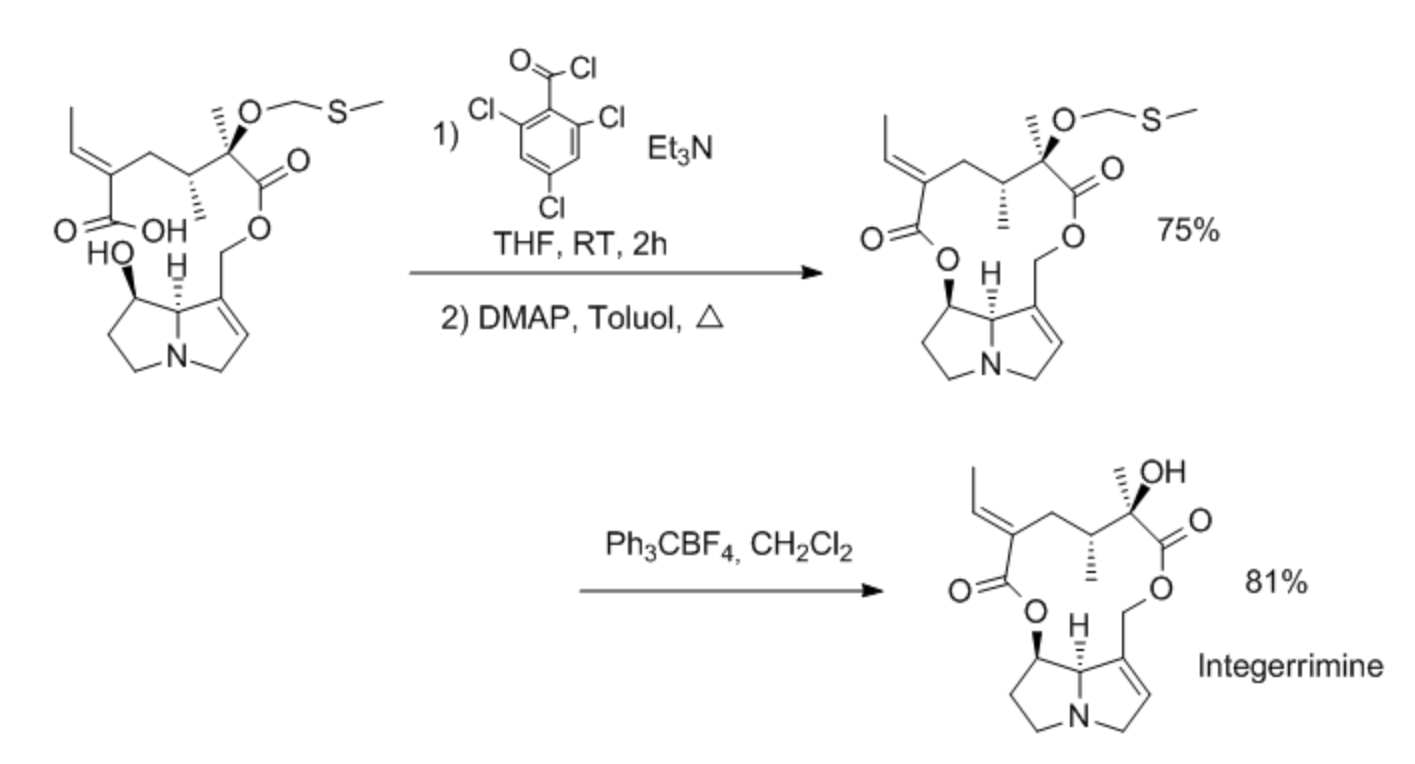
3.3 Mukaiyama-Methode

Mechanismus:



3.4 Yamaguchi - Methode

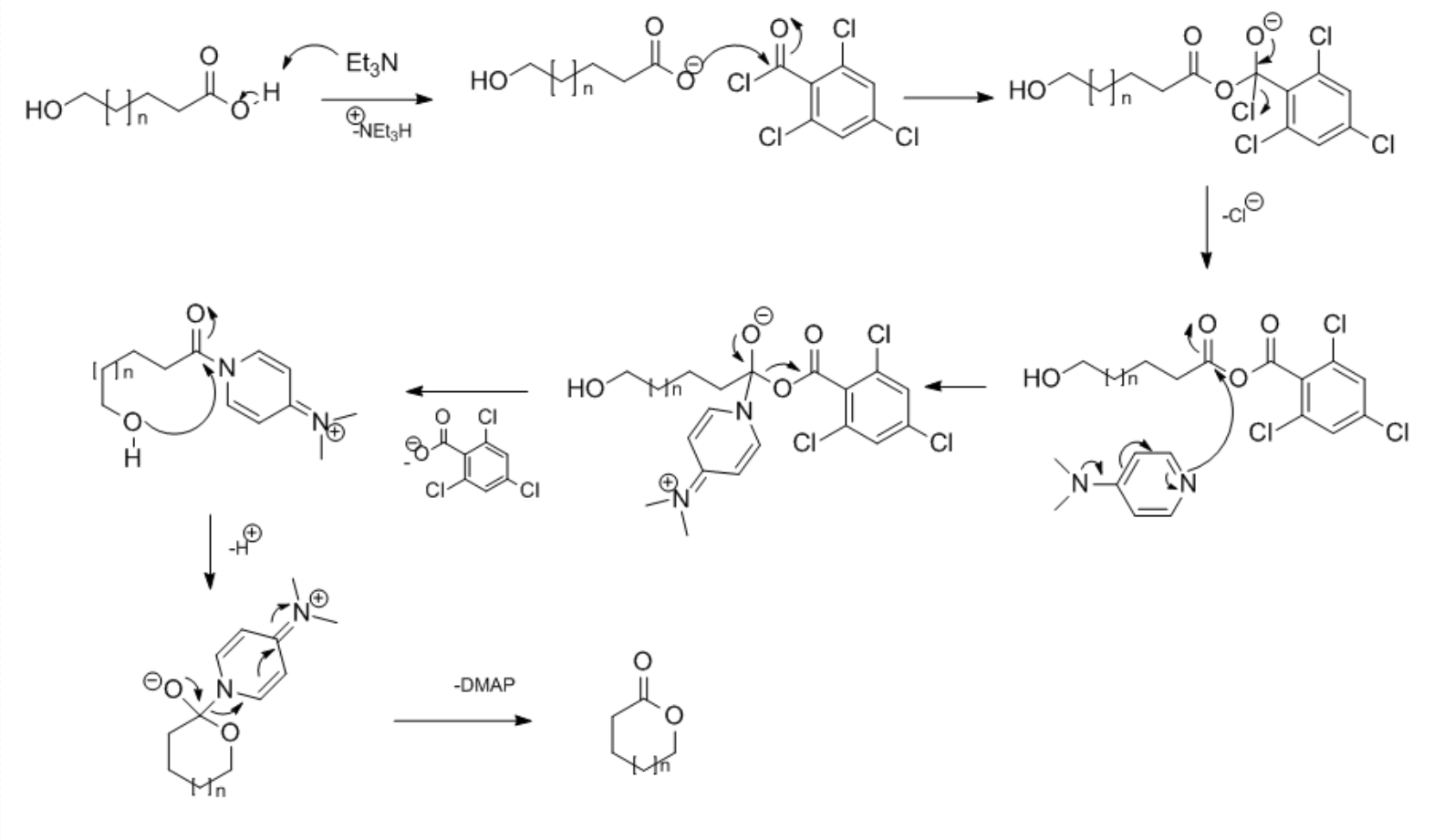
Anwendungsbeispiel:



H. Niwa et al., *Tetrahedron,* (**1992**), Vol. 48, No. 3, 393-412

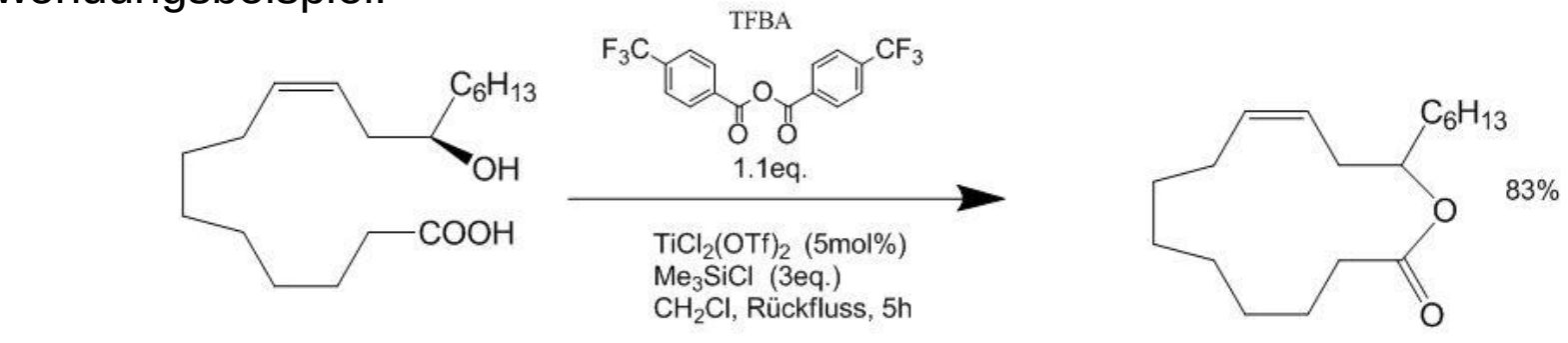
3.4 Yamaguchi - Methode

Mechanismus:

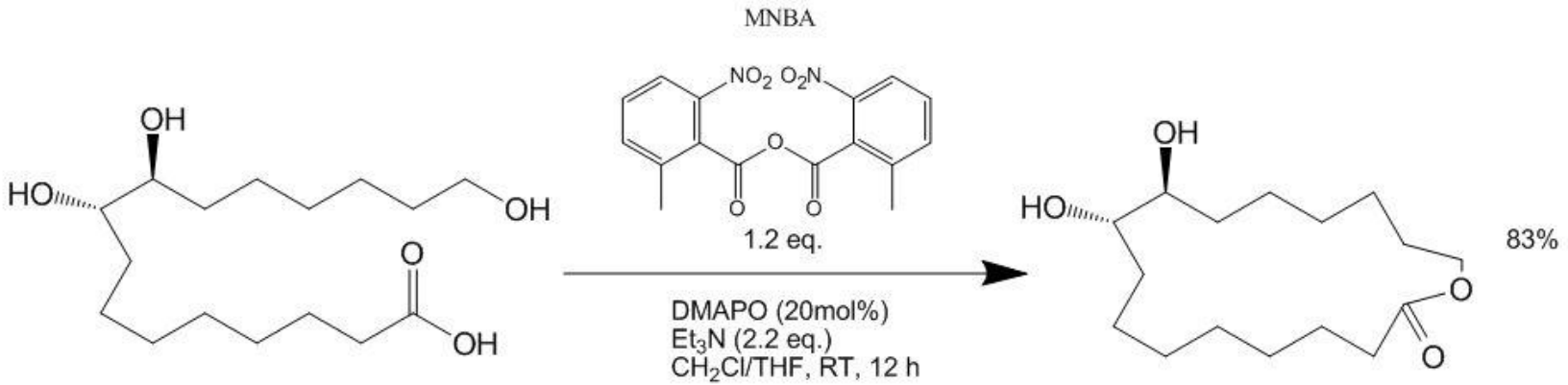


3.5 Shiina - Methode

Anwendungsbeispiel:



Ricinolsäure-Lacton

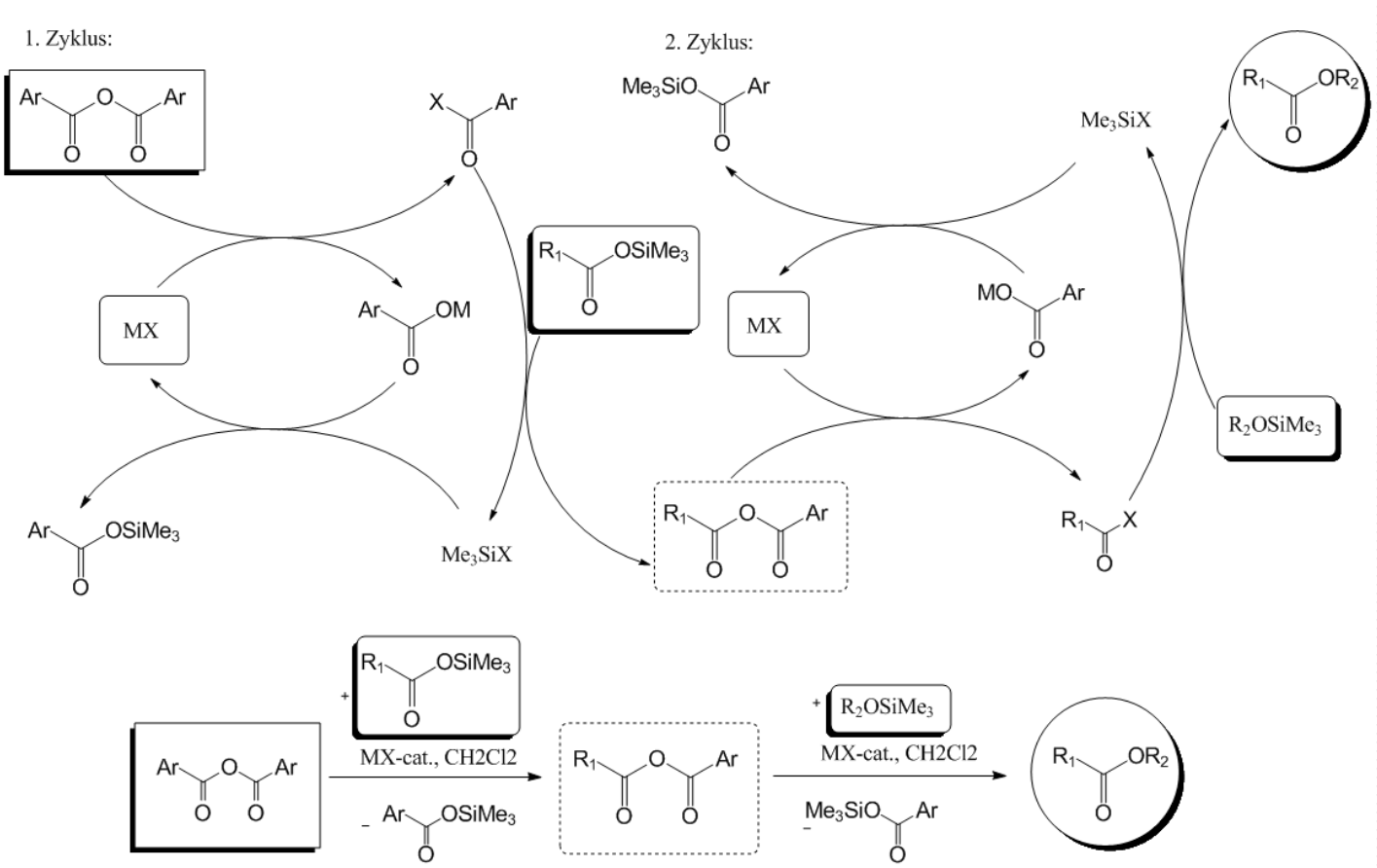


Aleuritinsäure-Lacton

I. Shiina, H. Fukui, A. Sasaki, *Nature Protocols*, (**2007**),Vol. 2, No. 10

3.5 Shiina - Methode

Mechanismus:

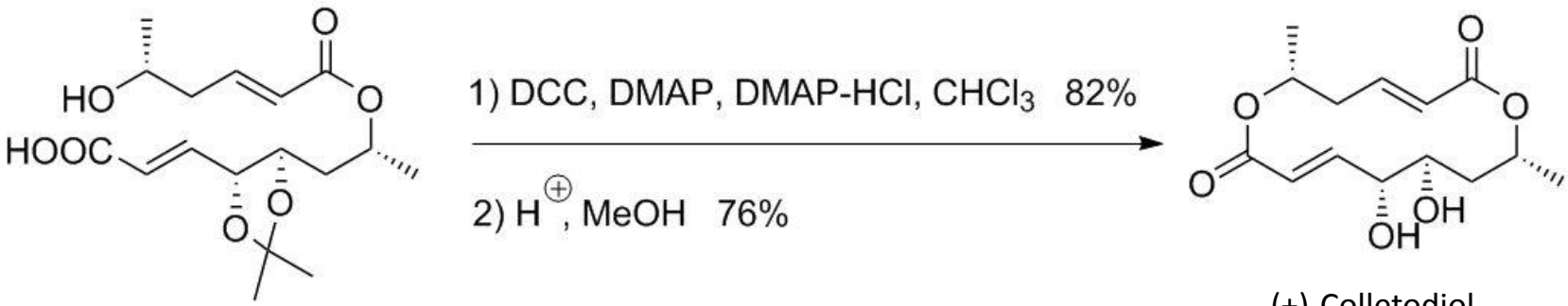


I. Shiina, *Tetrahedron,* (**2004**), 60, 1587-1599

MX= $Sn(OTf)_2$, $TiCl_2(ClO_4)_2$, $TiCl_2(OTf)_2$, $ZrCl_2(OTf)_2$, $HfCl_2(OTf)_2$, $AlCl(OTf)_2$

3.6 Keck - Steglich - Methode

Anwendungsbeispiel:

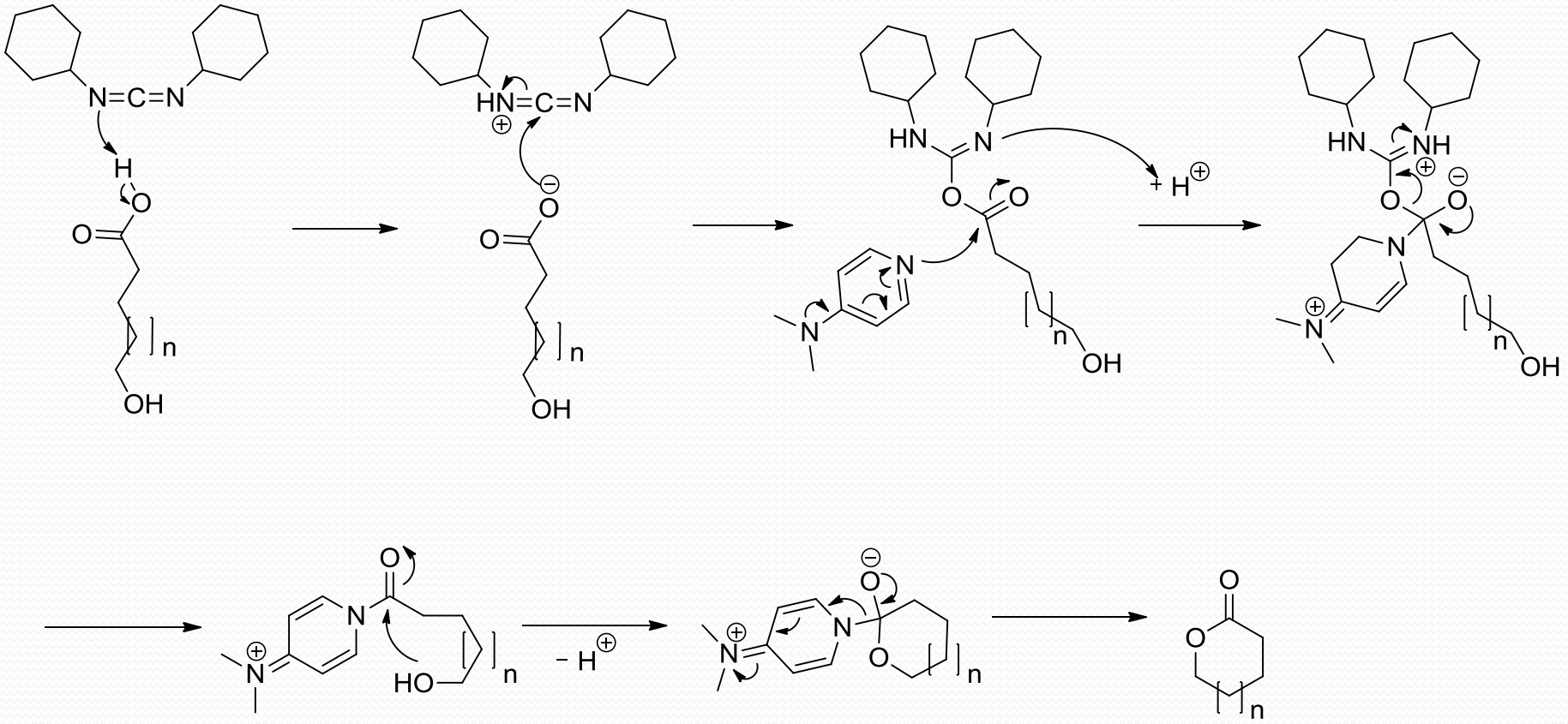


(+)-Colletodiol

G.E. Keck et al., *J. Org. Chem., (***1989),** Vol. 54, No. 4

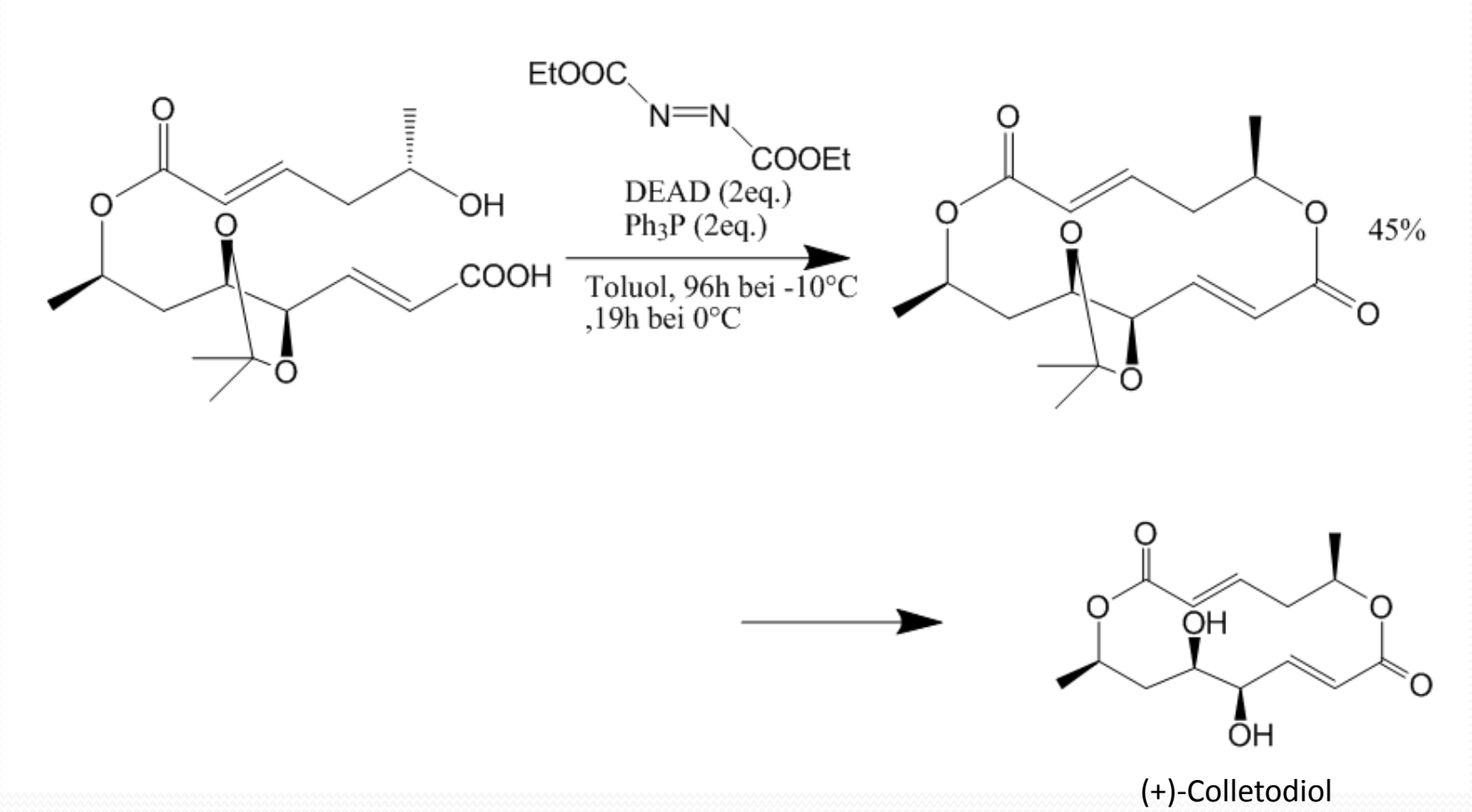
3.6 Keck - Steglich - Methode

Mechanismus:



3.7 Mitsunobu - Methode

Anwendungsbeispiel:

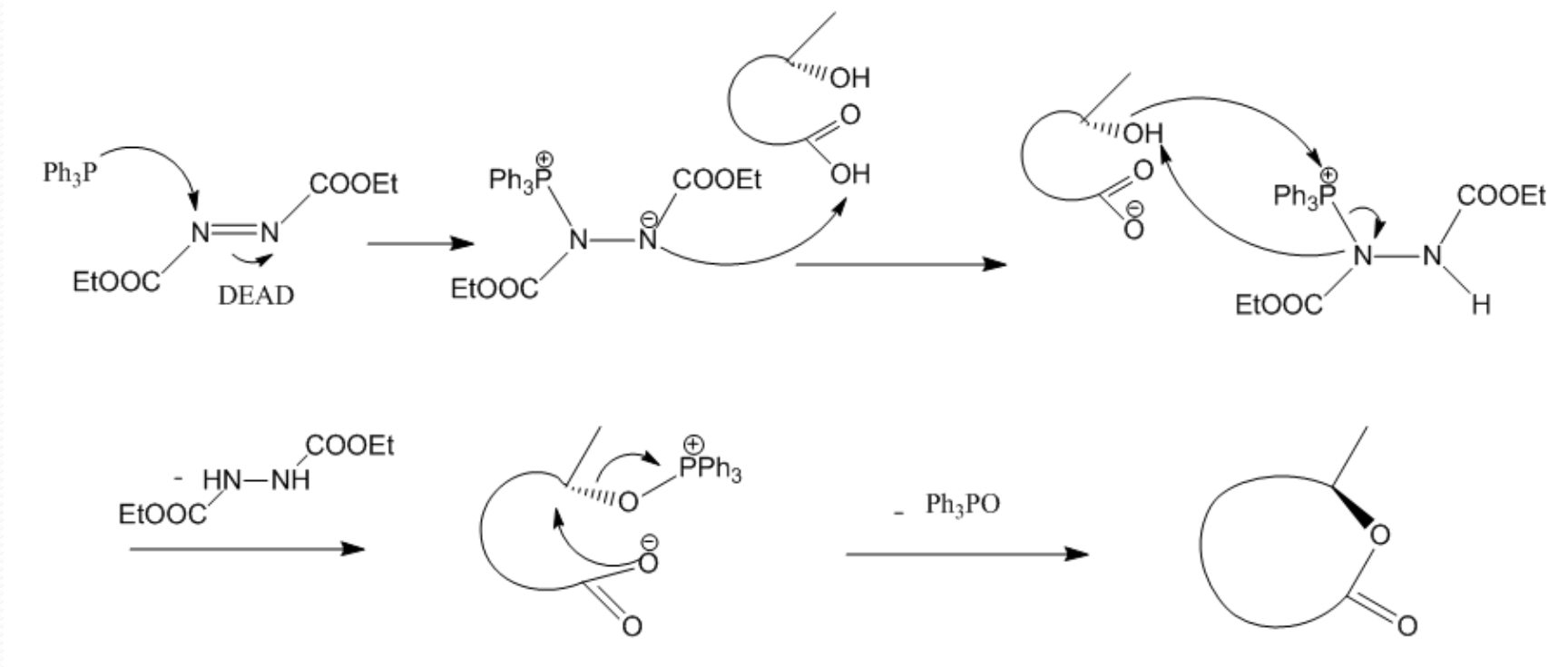


(+)-Colletodiol

H. Tsutsui, O. Mitsunobu, *Tetrahedron Lett.,* (**1984**), Vol. 25, No. 20, 2163-2166

3.7 Mitsunobu - Methode

Mechanismus:



Mitsunobu, O., Synthesis 1–28 **(1981)**

4. Literatur

- *Current Topics in Medicinal Chemistry,* ***(2003),*** Vol. 3, No. 9
- *Angew. Chem.,* **(1997),** 109, Nr. 5
- *J. Chromatogr.* B, **(2006)**, 844, 175–203
- *Angew. Chem., **(2000)**, 112, 3106-3138*
- *The Chemical Record*, **(2009),** Vol. 9, 305–320
- *Journal of Medicinal Chemistry*, **(2010),** Vol. 53, No. 15
- *J. Am. Chem. Soc.,* **(1988)**, 110, 4041
- *J. Am. Chem. Soc. (**1987**)*, 109, 6205
- *J. Am. Chem. Soc.* **(1975)** 97, 3512–3516
- *J. Am. Chem. Soc., (**2009**),*Vol. 131, No. 34
- *Tetrahedron,*(**1992**), Vol. 48, No. 3, pp. 393-412
- *J. Org. Chem., (**1989**),* Vol. 54, No. 4
- *Tetrahedron Lett.,* **(1984)**, Vol. 25, No. 20, 2163-2166
- *Nature Protocols*, **(2007)**, Vol. 2, No. 10
- *Tetrahedron,* **(2004)**, 60, 1587-1599
- Mitsunobu, O., Synthesis 1–28 **(1981)**