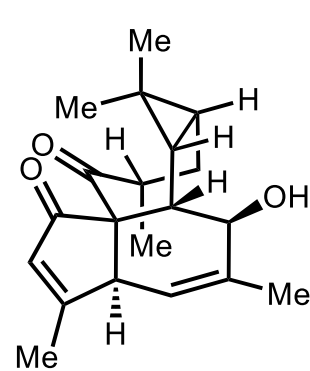
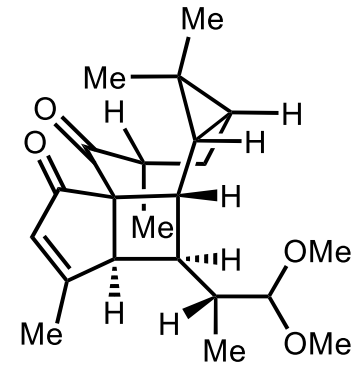


# Total Syntheses of *Euphorbia* Diterpenoids Pepluanol A and Pepluacetal



pepluanol A



Pepluacetal

**Reporter: Yi Ma**

**Supervisor: Prof. Quan Cai**

**2026.4.10**

## 1. Introduction

## 2. Total Syntheses of Pepluanol A and Pepluacetal

- ✓ Hanfeng Ding (2017, **Pepluanol A**)
- ✓ Tanja Gaich (2021, **Pepluanol A**)
- ✓ Xuegong She (2024, **Pepluactal**)
- ✓ Yu Sun (2026, **Pepluanol A** and **Pepluactal**)

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## 3. Summary

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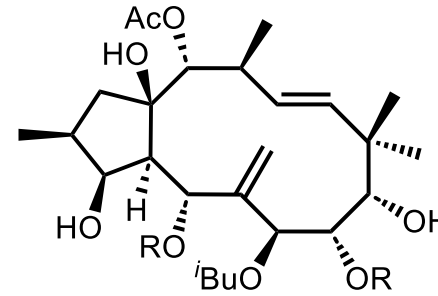
## *Euphorbia Diterpenoids*



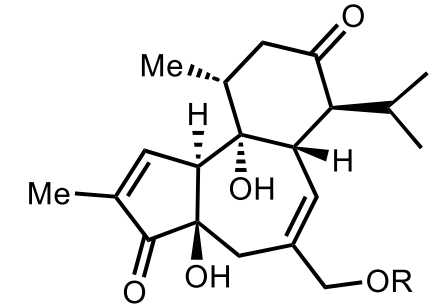
*Euphorbia serrata*

### Euphorbia diterpenoids

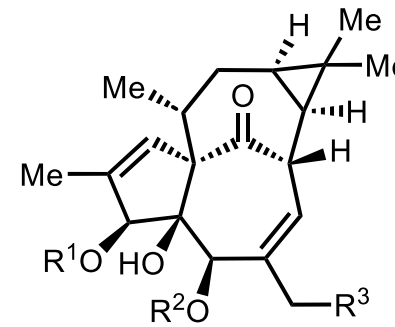
- 750+ Congeners
- Isolated from plants of the genus *Euphorbia*.
- Complex and distinctive carbon skeletons
- A broad spectrum of significant biological activities



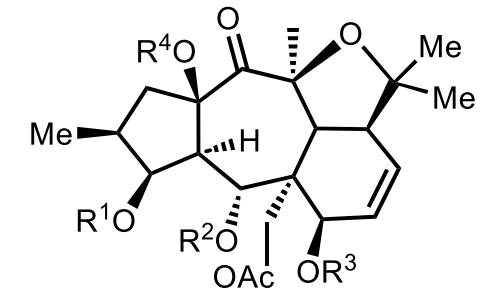
Jatrophanes



Daphnanes



Ingenanes



Myrsinanes

# 1. Introduction

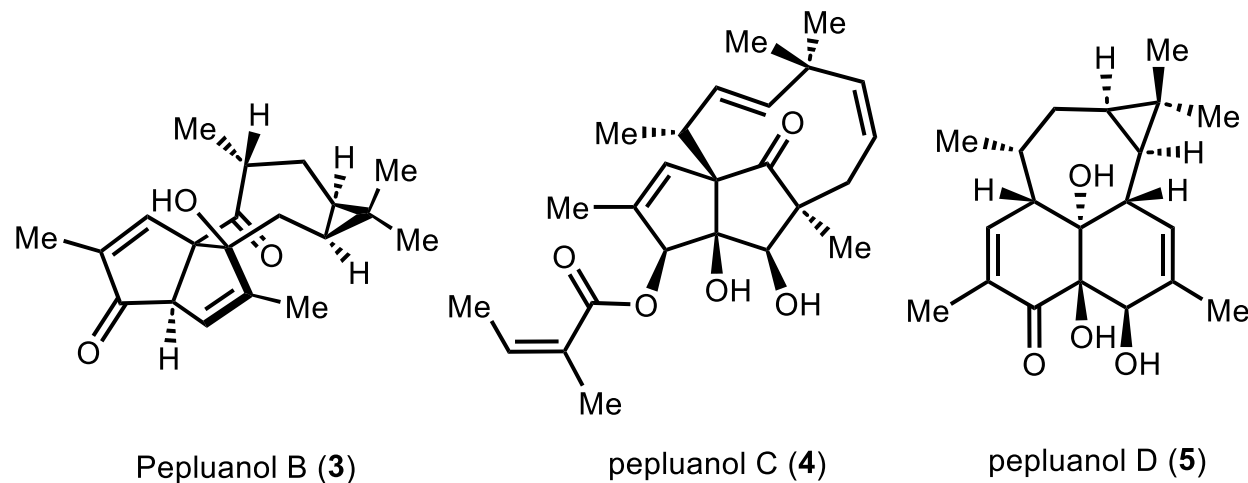
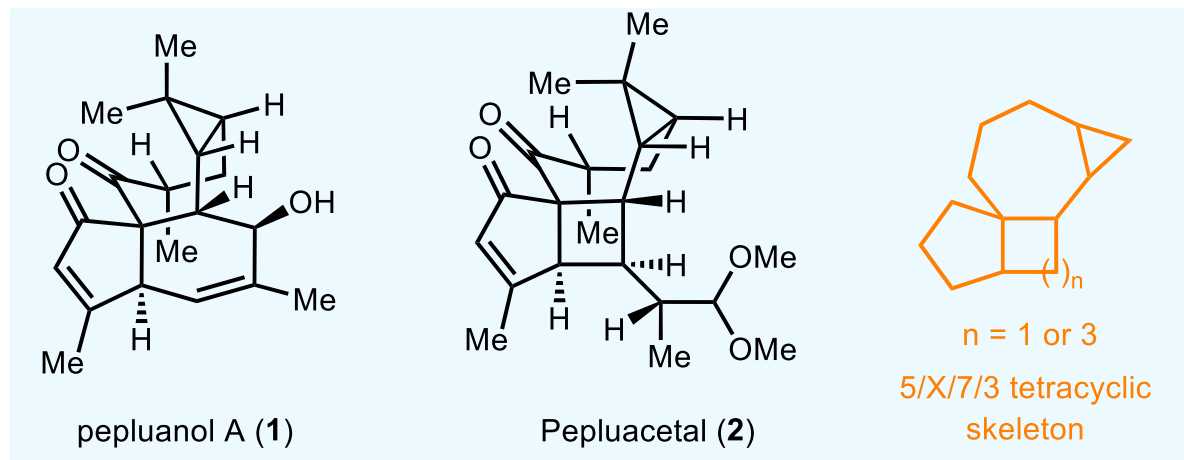
## *Euphorbia Diterpnoids*——*Pepluanol Family*



herb *E. peplus* (斑地锦)  
In southwestern China

### Biological Activity

- Effective inhibitory activity on the Kv1.3 potassium channel
- Pepluanol B gave IC<sub>50</sub> value of 9.50 μM



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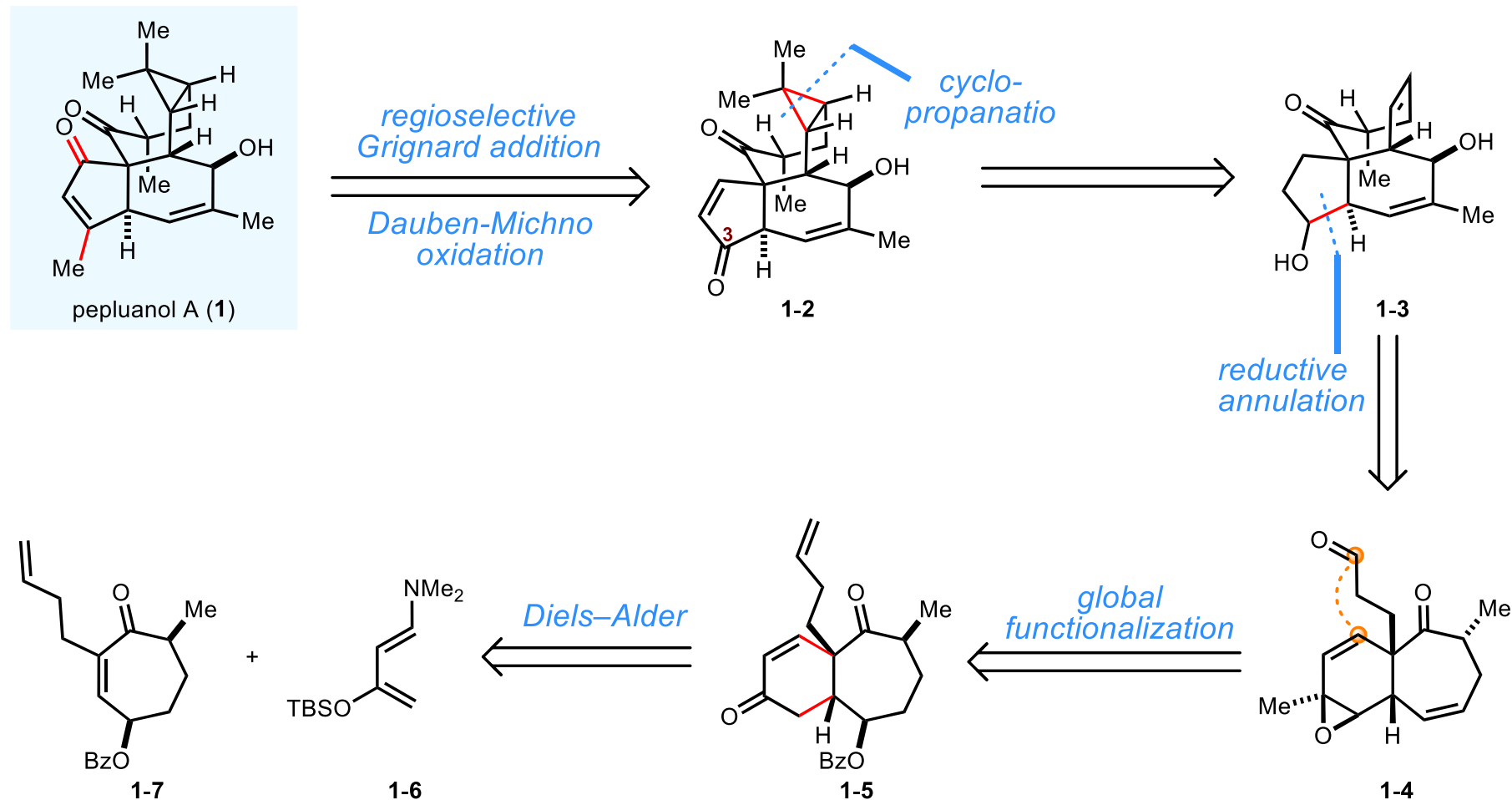
## 3. Summary

# 2.1. Pepluanol A —Ding (2017)

## Retrosynthetic Analysis

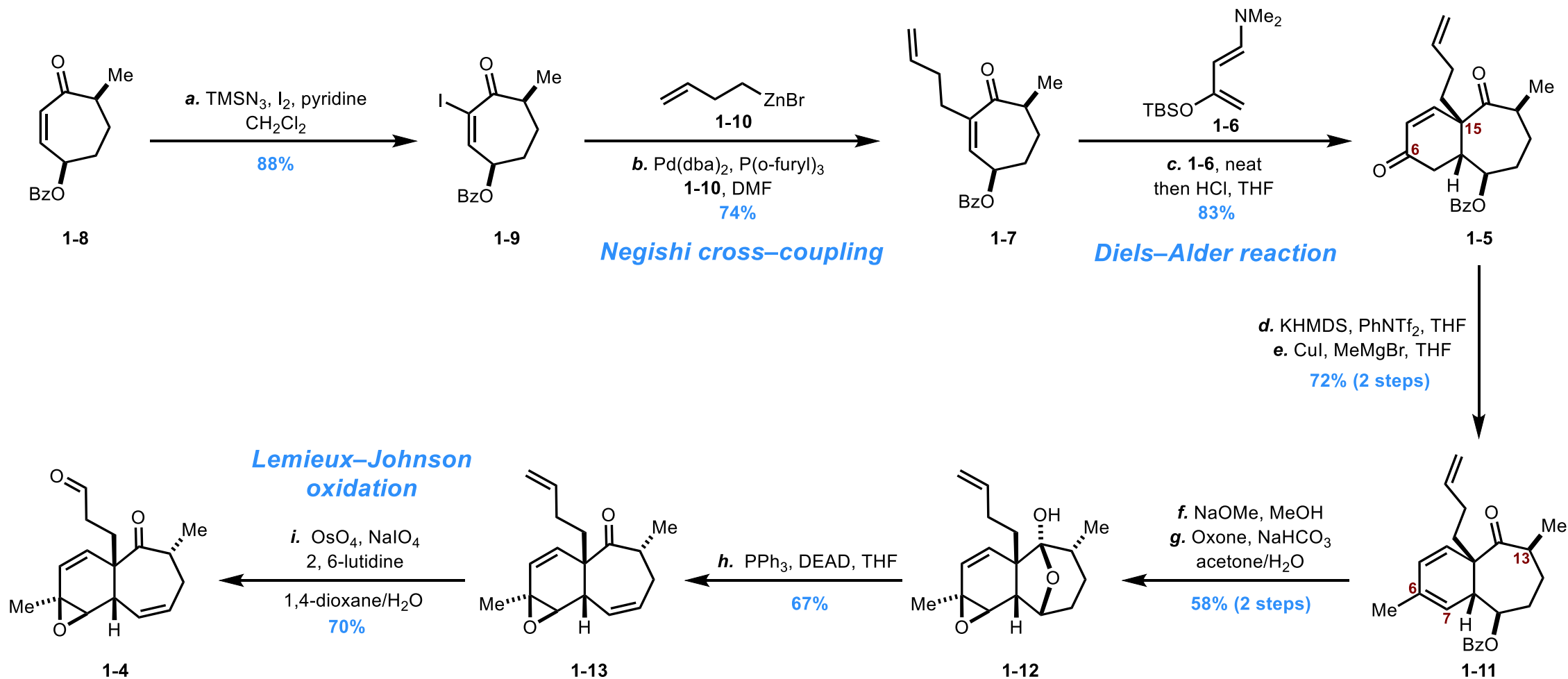


Hanfeng Ding



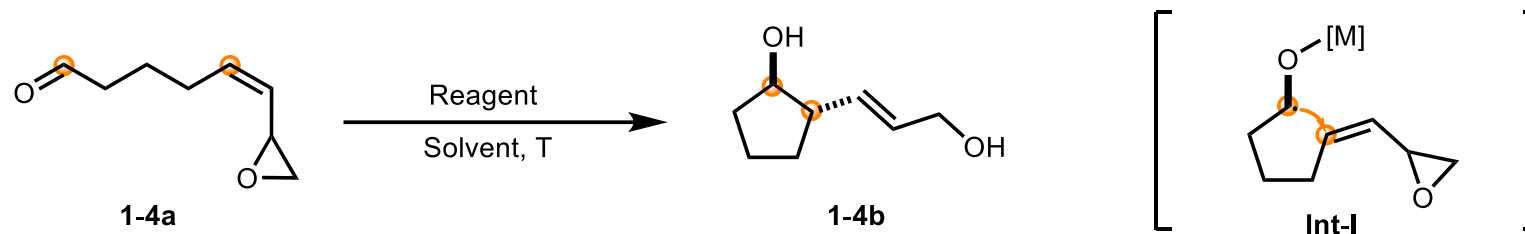
# 2.1. Pepluanol A —Ding (2017)

## Construction of the 6/7 Bicyclic Skeleton



## 2.1. Pepluanol A —Ding (2017)

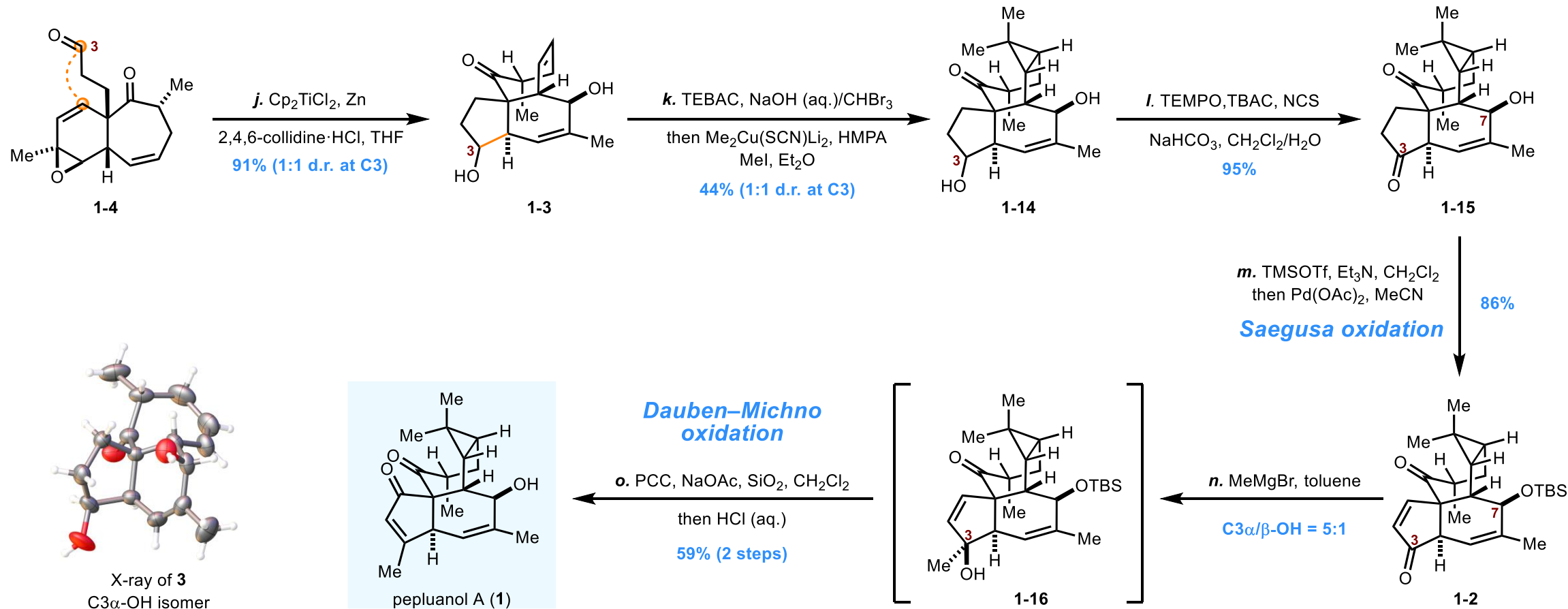
### Optimization on the reductive annulation



Entry	Reagent	Solvent	T [°C]	Yield [%] (d.r.)
1	SmI <sub>2</sub> /HMPA	THF	25	52 (> 20:1)
2	<i>n</i> Bu <sub>3</sub> SnH/AIBN	benzene	80	33 (1.3:1)
3	<i>n</i> Bu <sub>3</sub> SnH/Et <sub>3</sub> B/O <sub>2</sub>	toluene	25	<5 (–)
4	Cp <sub>2</sub> TiCl <sub>2</sub> /Mn	THF	25	83 (1.5:1)
5	Cp <sub>2</sub> TiCl <sub>2</sub> /Zn	THF	25	88 (1.5:1)
7	Cp <sub>2</sub> TiCl <sub>2</sub> /Zn	THF	0	87 (1.5:1)
8	Cp <sub>2</sub> TiCl <sub>2</sub> /Zn/DIPEA	THF	25	85 (1.5:1)
9	Cp <sub>2</sub> TiCl <sub>2</sub> /Zn/collidine HCl	THF	25	95 (1.5:1)

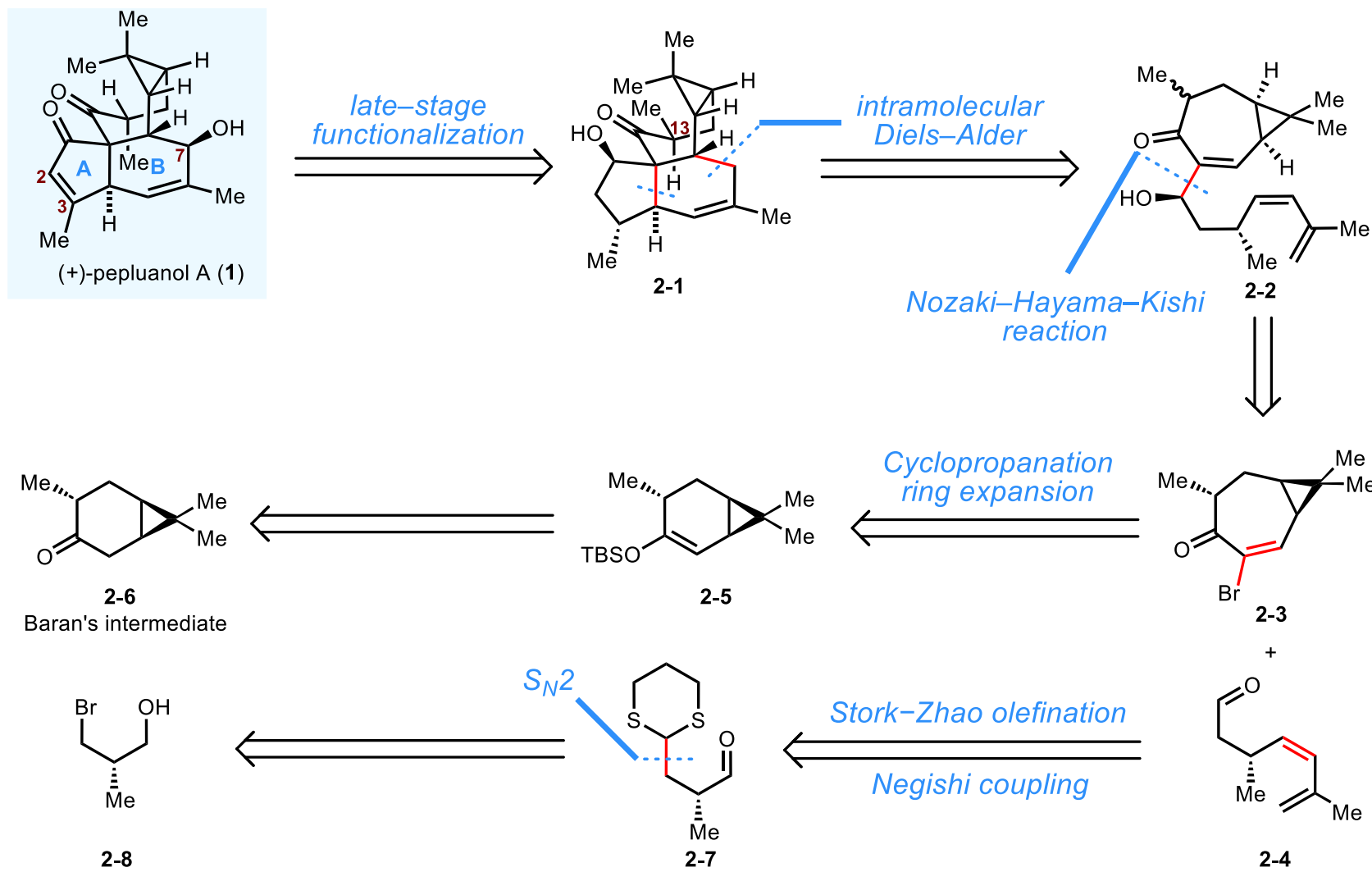
# 2.1. Pepluanol A —Ding (2017)

## End game



# 2.1. Pepluanol A — Gaich (2021)

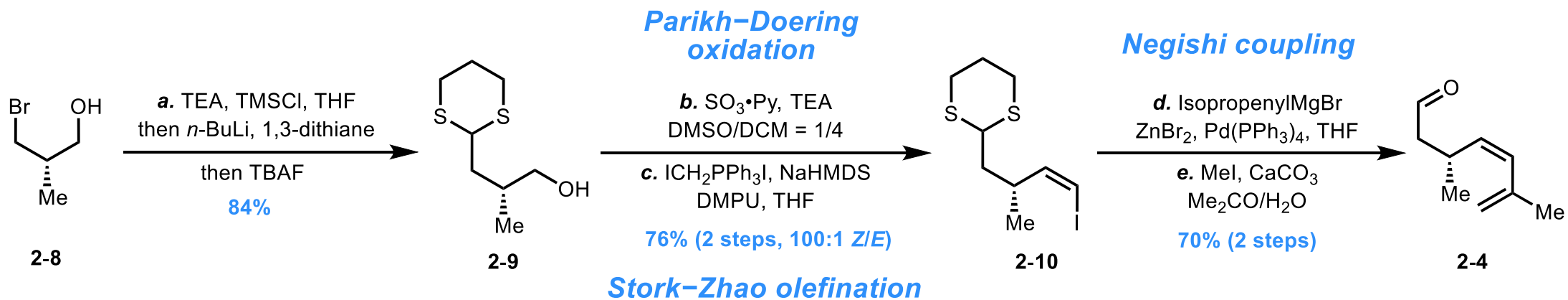
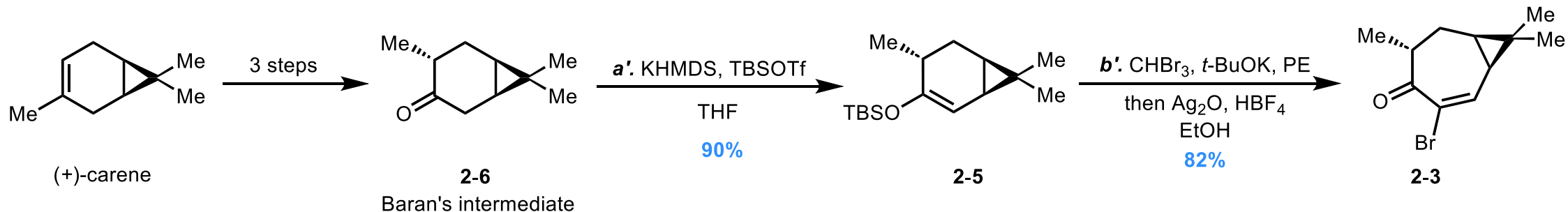
## Retrosynthetic Analysis



**Tanja Gaich**

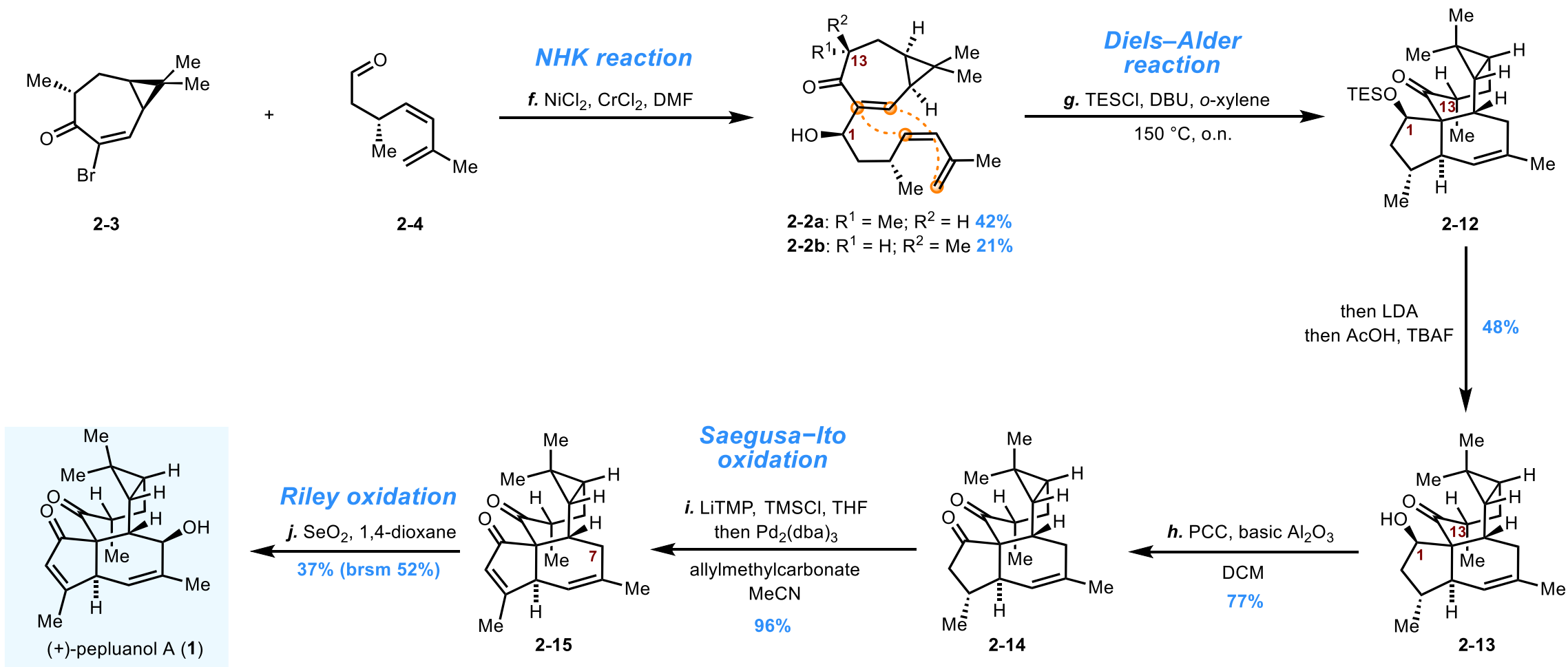
# 2.1. Pepluanol A — Gaich (2021)

## Preparation of Building Blocks



# 2.1. Pepluanol A — Gaich (2021)

## Convergent Total Synthesis of Pepluanol A

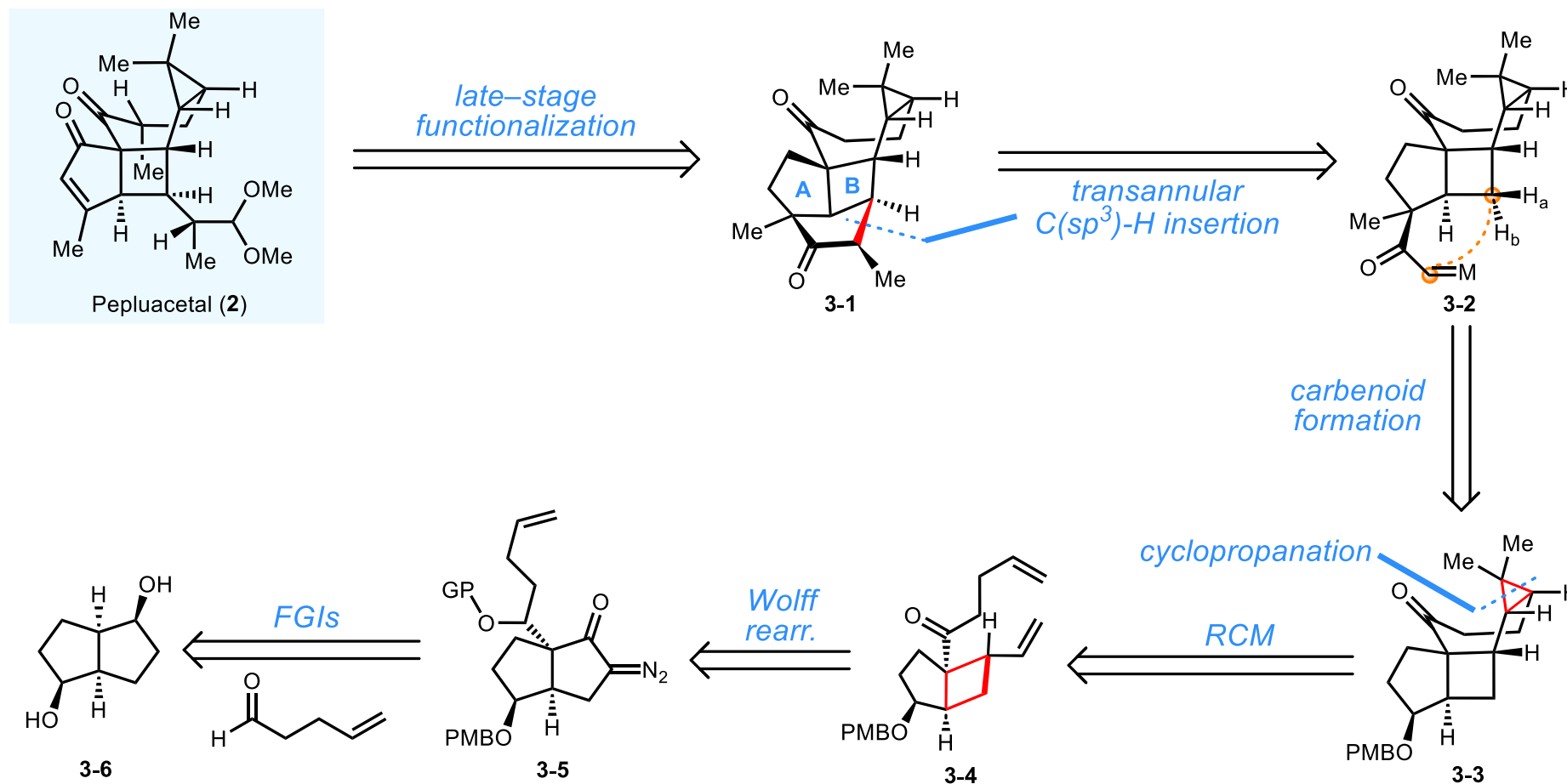


# 3. Pepluacetal—She (2024)

## Retrosynthetic Analysis

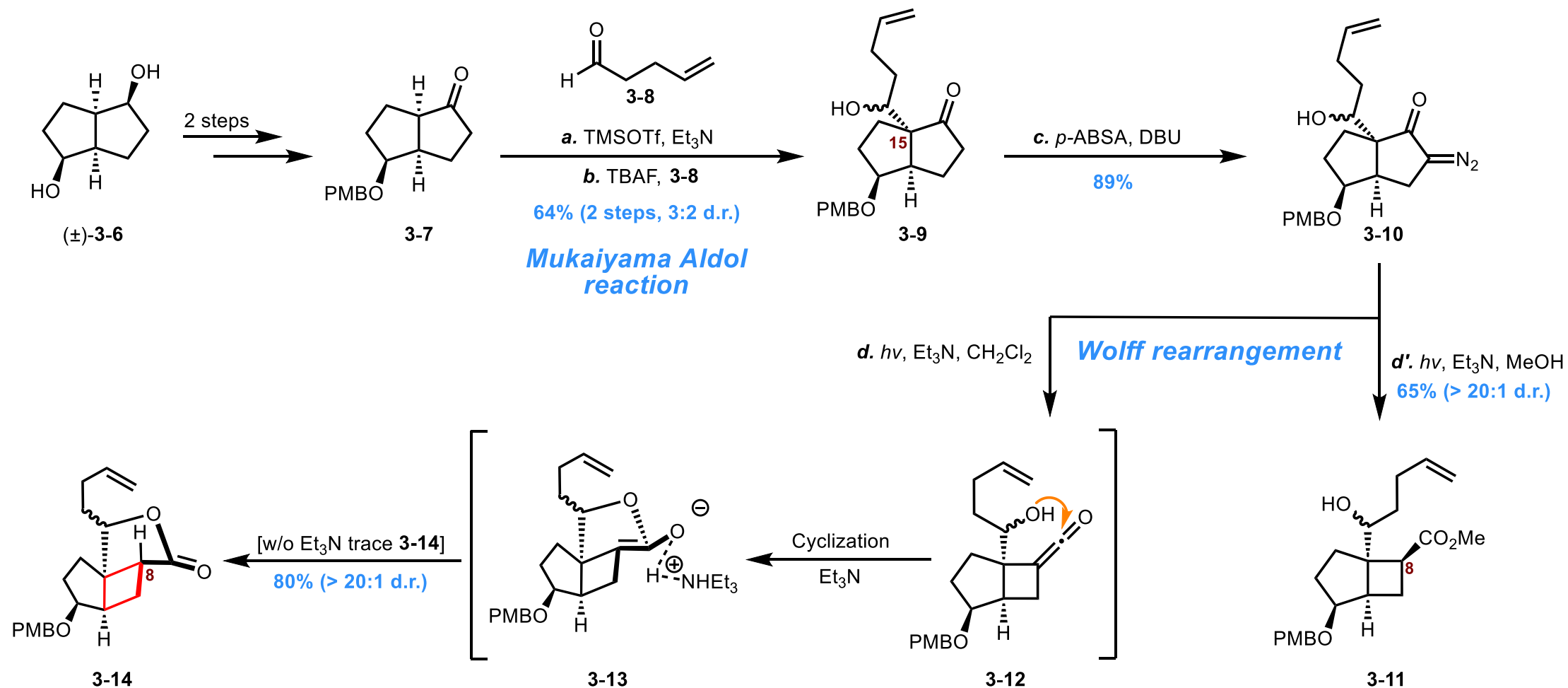


Xuegong She



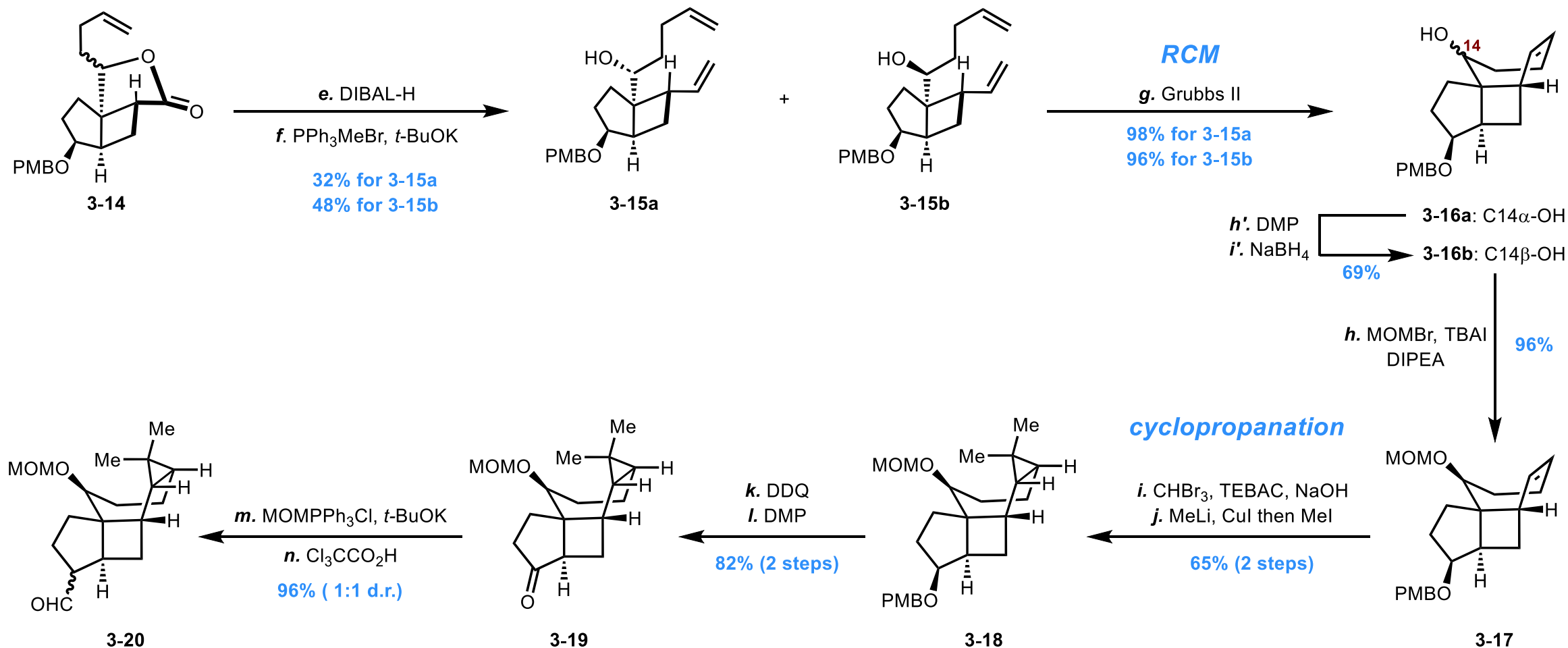
# 3. Pepluacetal — She (2024)

## Investigation of the Wolff Rearrangement



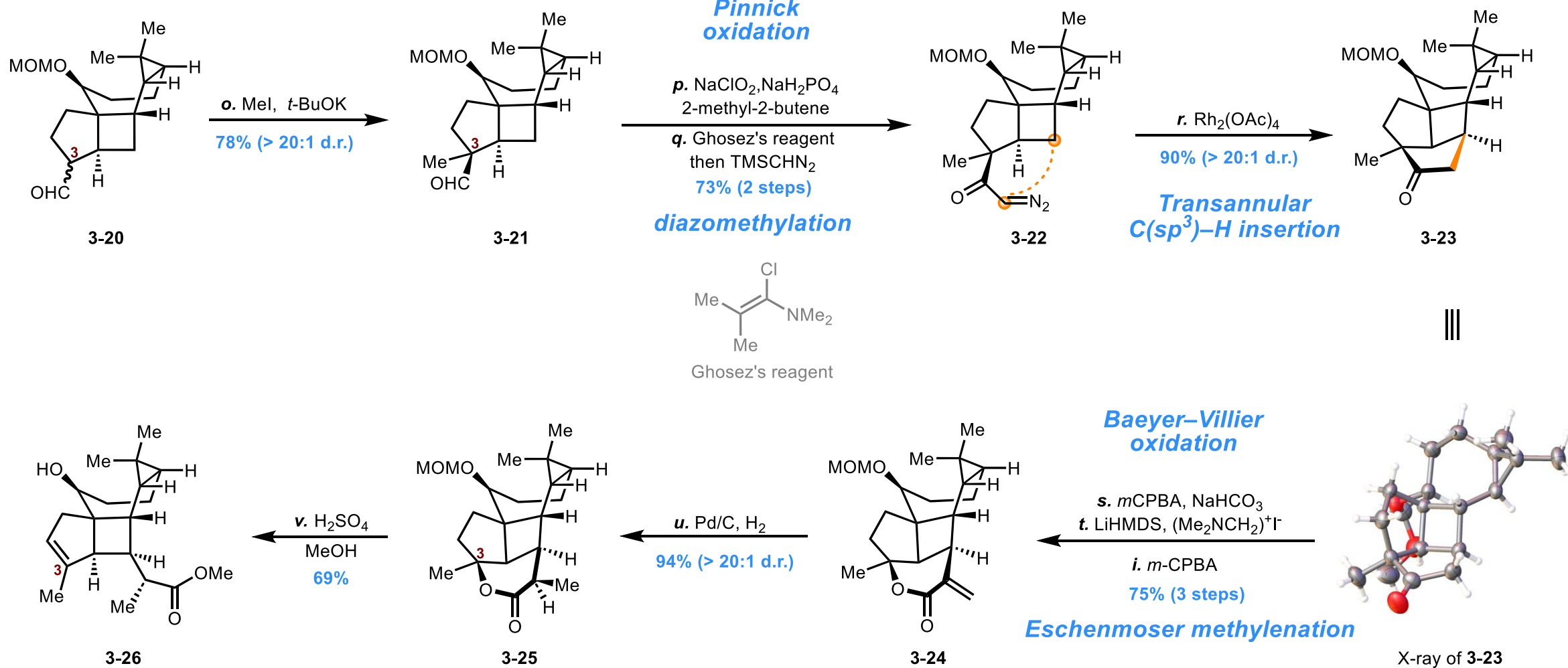
# 3. Pepluacetal — She (2024)

## Construction of the Tetracyclic intermediate



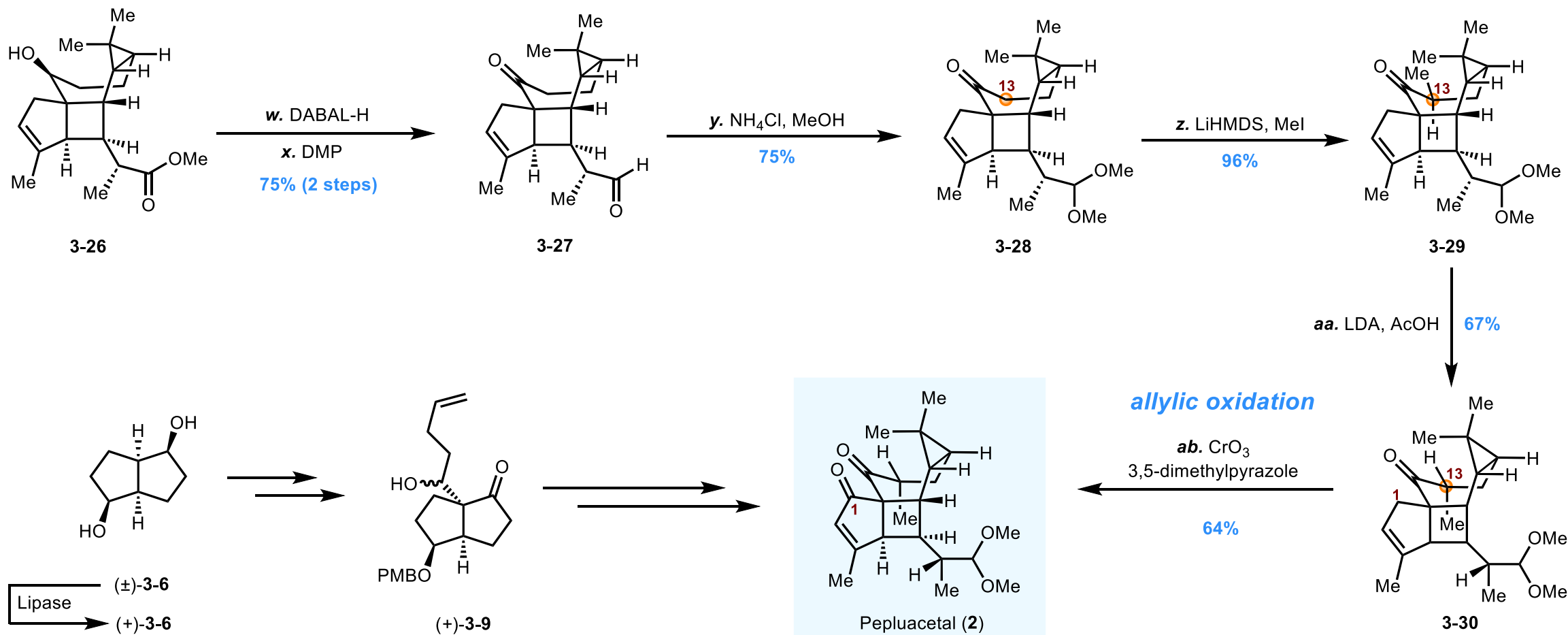
# 3. Pepluacetal — She (2024)

## Installation of the side chain



# 3. Pepluacetal — She (2024)

## End Game

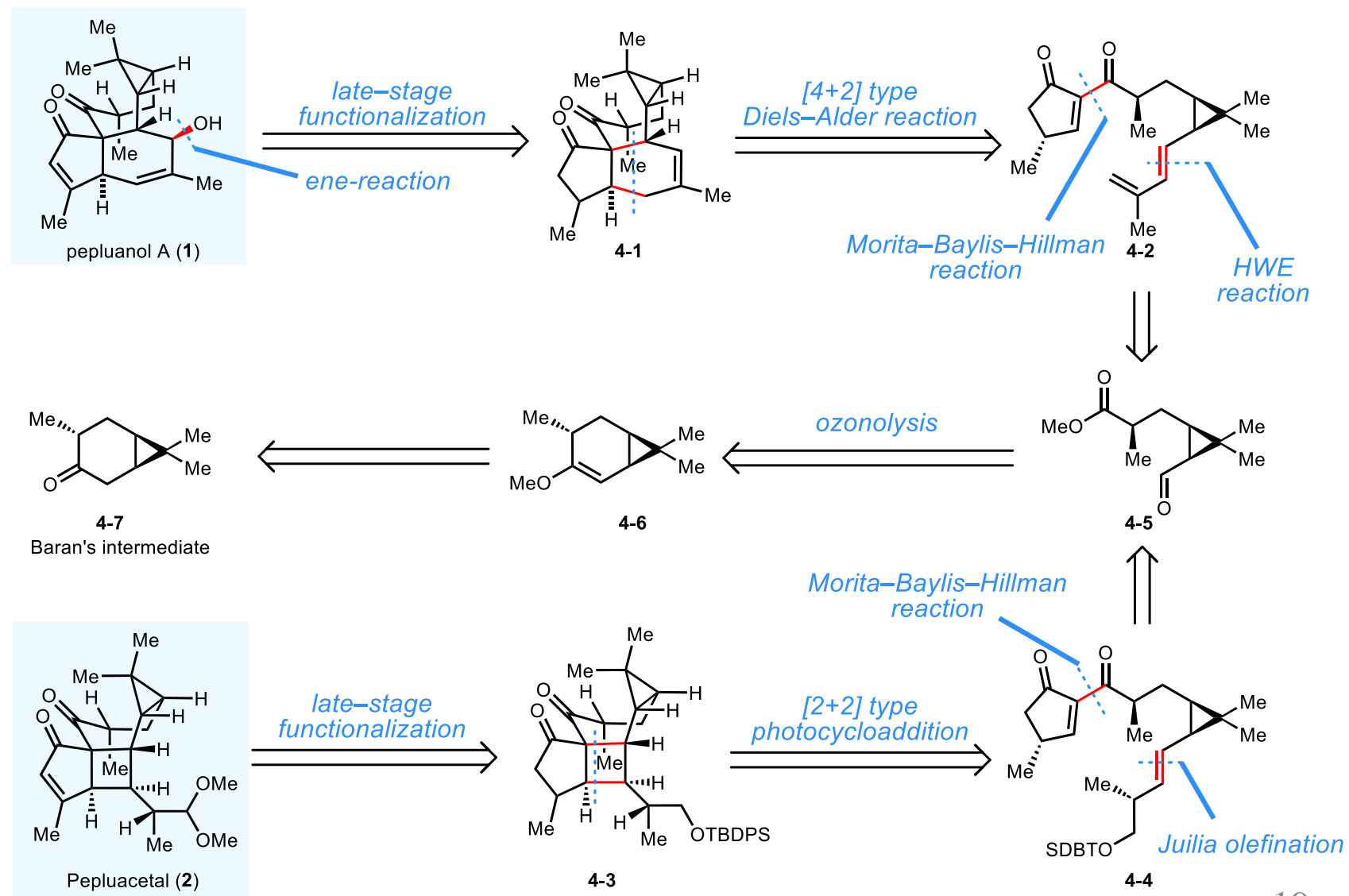


## 2.5. Pepluanol A and Pepluacetal — Sun (2026)

### Retrosynthetic Analysis



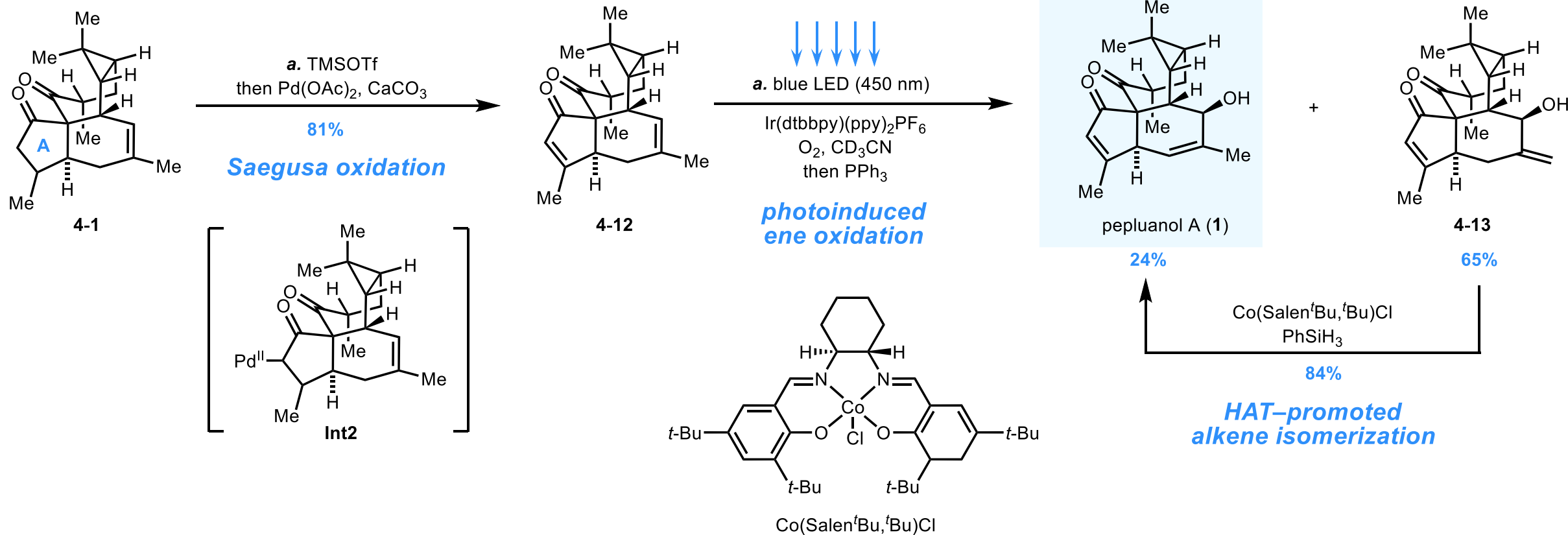
Yu Sun





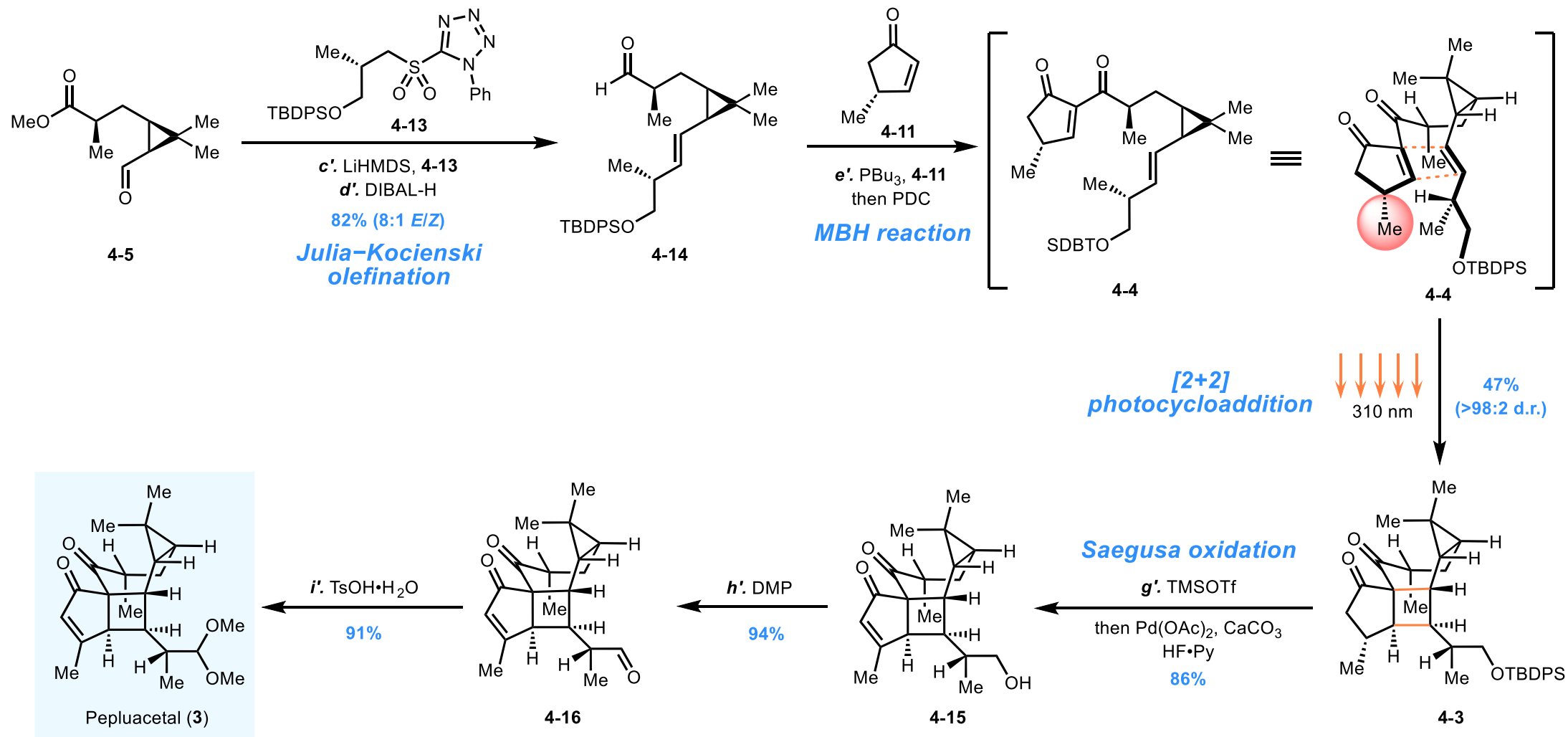
## 2.5. Pepluanol A and Pepluacetal — Sun (2026)

### End game



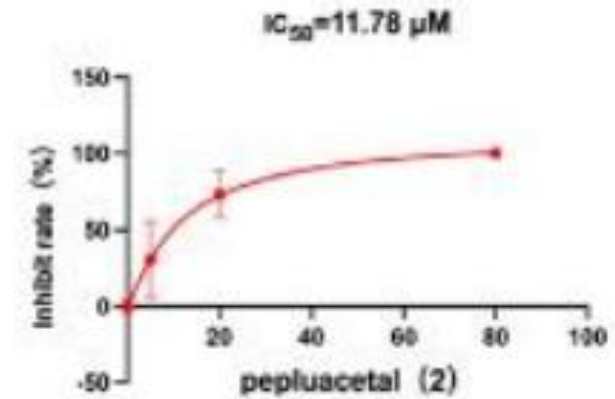
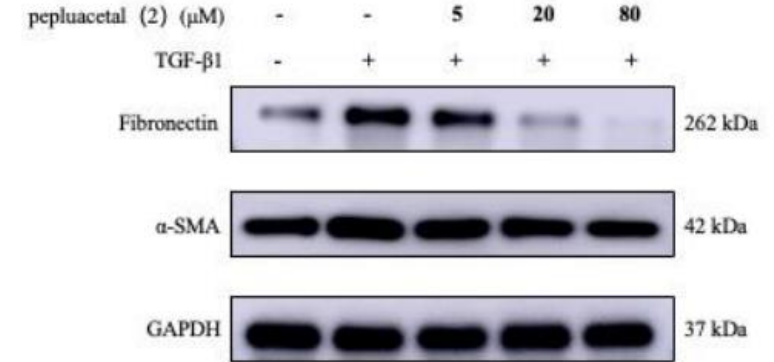
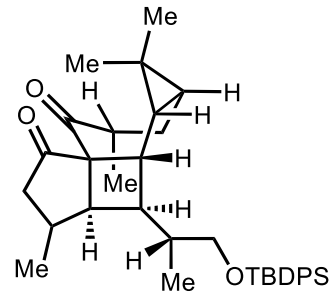
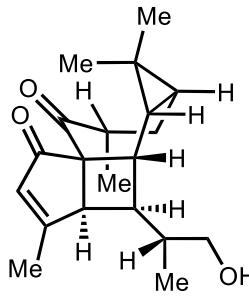
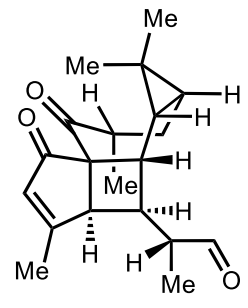
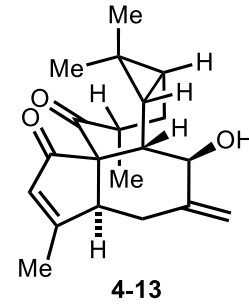
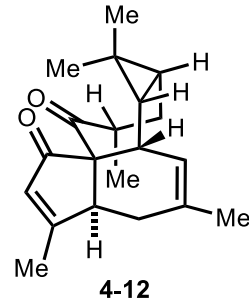
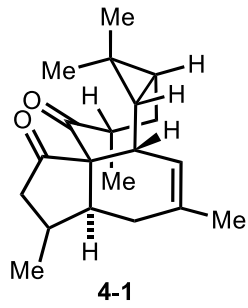
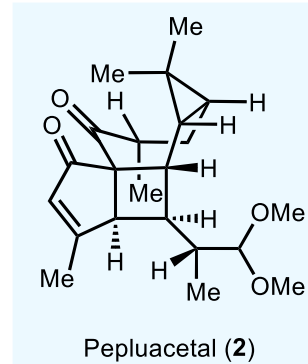
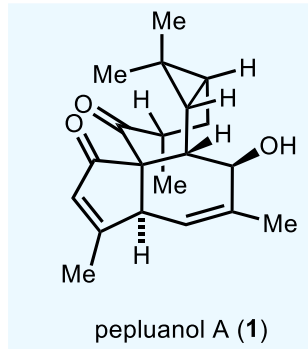
# 2.5. Pepluanol A and Pepluacetal — Sun (2026)

## Total synthesis of Pepluacetal



## 2.5. Pepluanol A and Peplucetal — Sun (2026)

### Antipulmonary fibrosis activity of Pepluanol diterpenoids and derivatives



## 1. Introduction

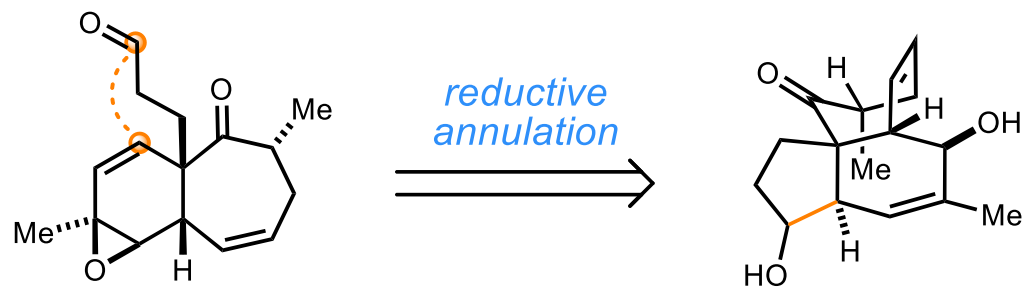
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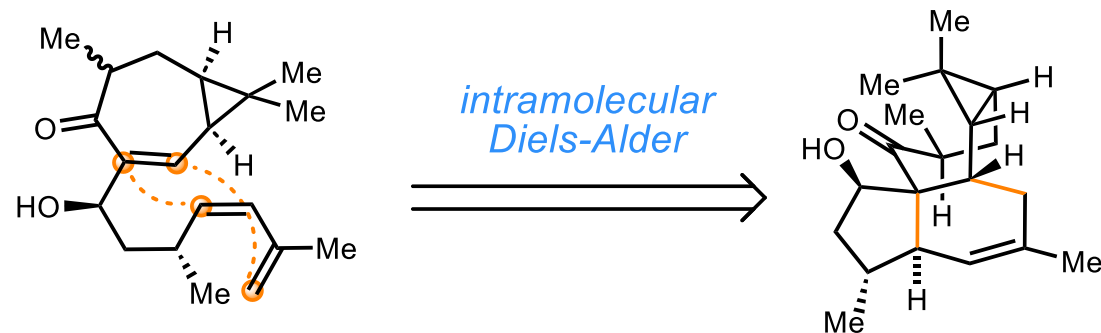
## 3. Summary

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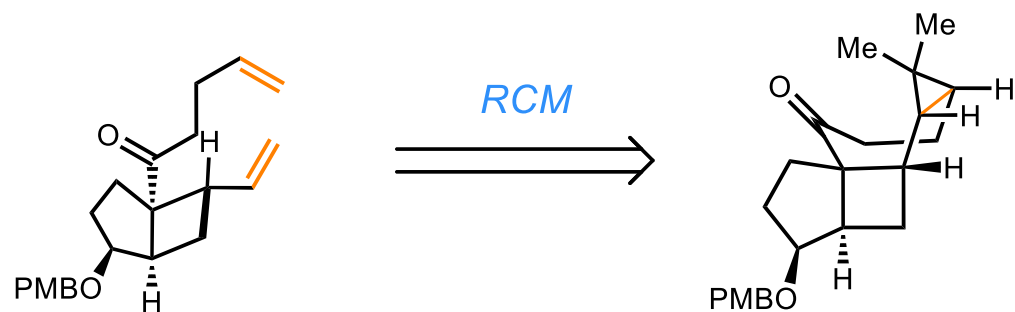
**Hanfeng Ding (2017):** 22 steps



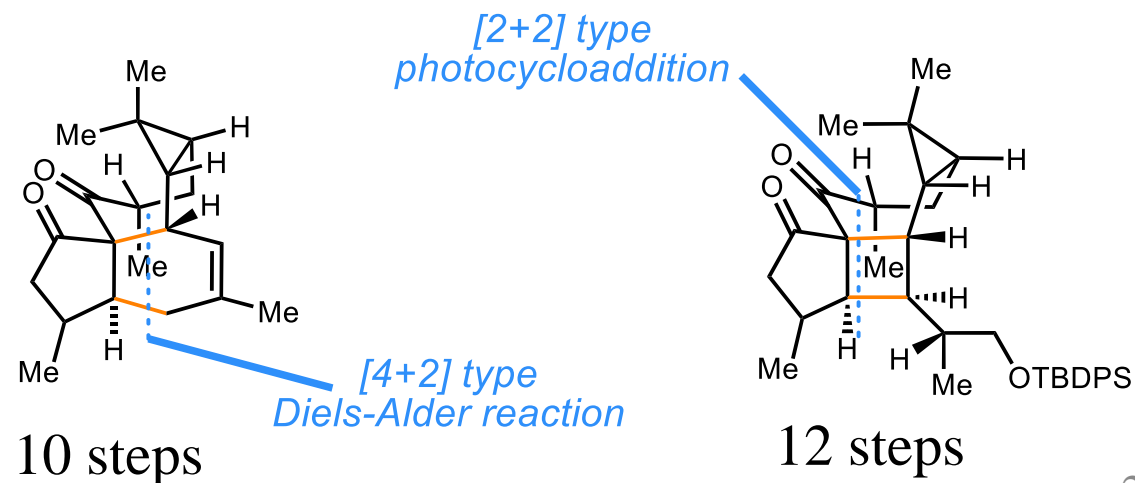
**Tanja Gaich (2021):** 10 steps



**Xuegong She (2024):** 27 steps



**Yu Sun (2026)**



*Thanks for your  
kind attention*