

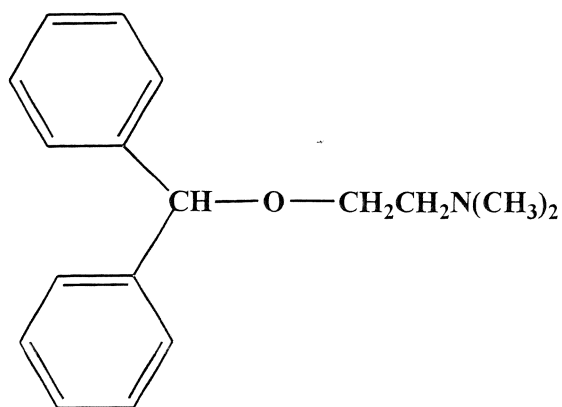
## Drug Synthesis

الاصطناع (التخليق) الدوائي

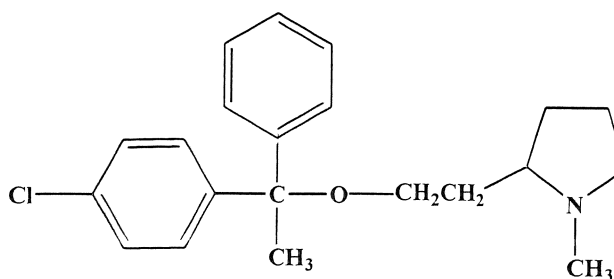
### 13. Diphenylmethanes Derivatives

#### Synthesis of anti-histaminic aminoalkyl ethers: diphenhydramine and Clemastine

- They are prepared by willamson synthesis

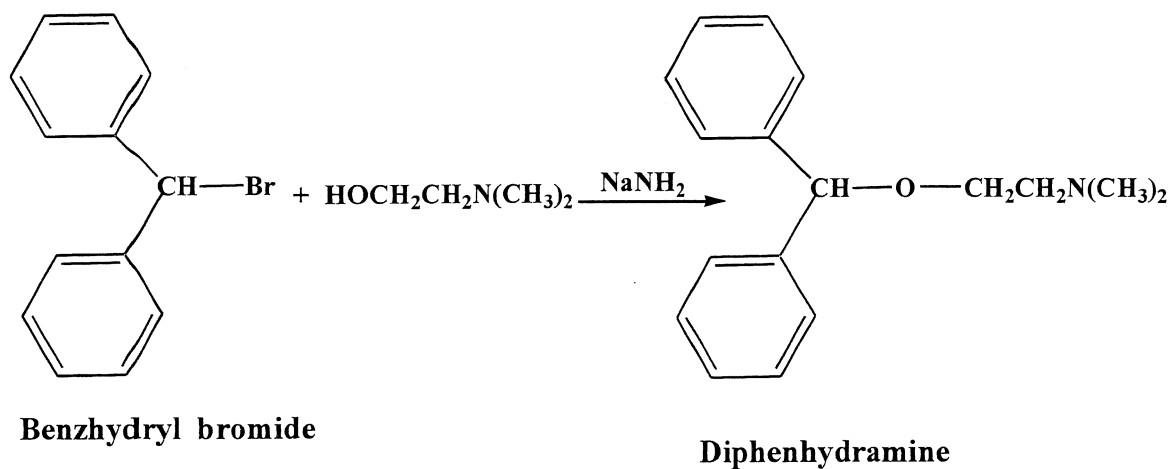


Diphenhydramine



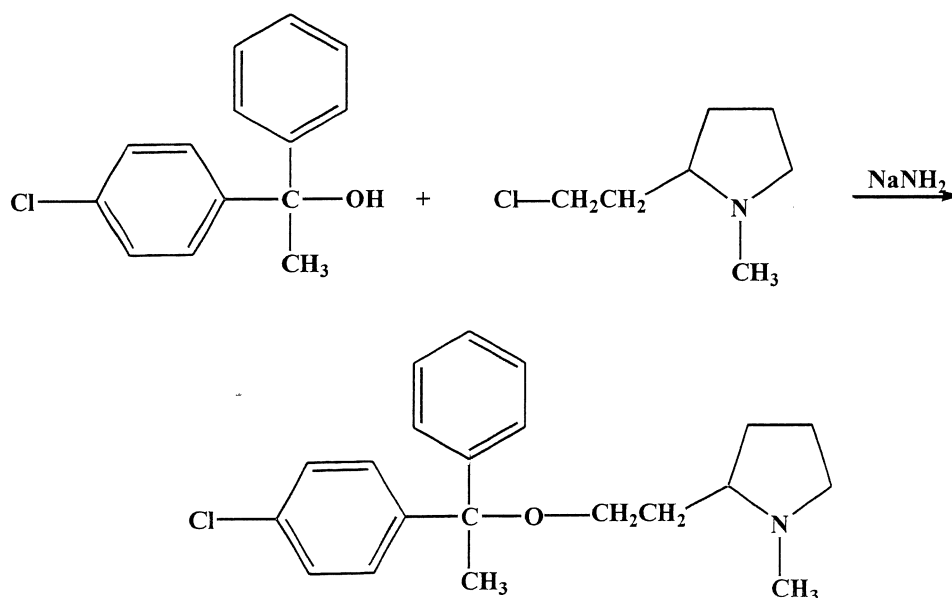
Clemastine

## Synthesis of anti-histaminic diphenhydramine



**2- diphenylmethoxy-  
N,N-dimethylethylamine**

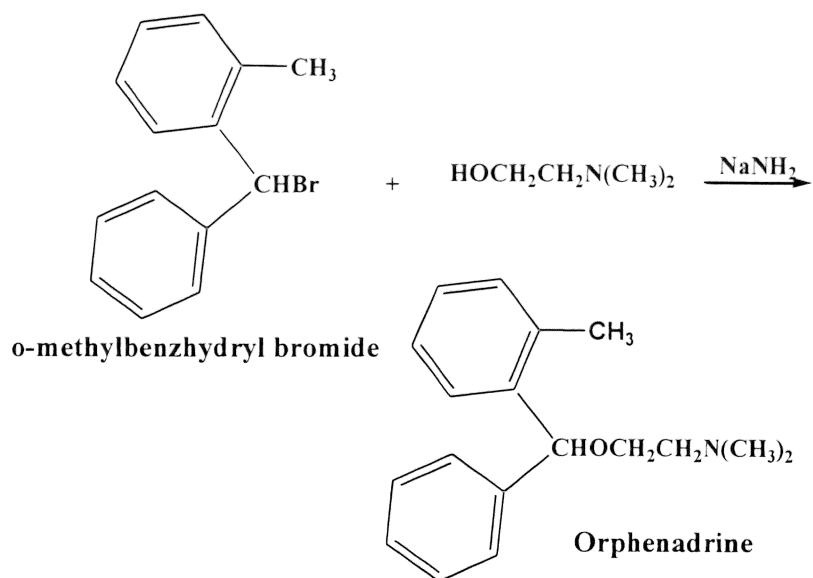
## Synthesis of anti-histaminic Clemastine



**Clemastine**

**(RR) 2-[2-[1-(4-chlorophenyl)-1-phenylethoxy]ethyl]-1-methylpyrrolidine**

## Synthesis of muscle relaxant Orphenadrine





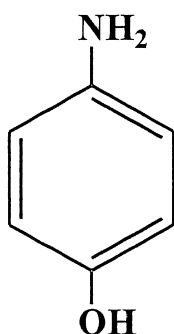
## **Drug Synthesis**

الاصطناع (التخليق) الدوائي

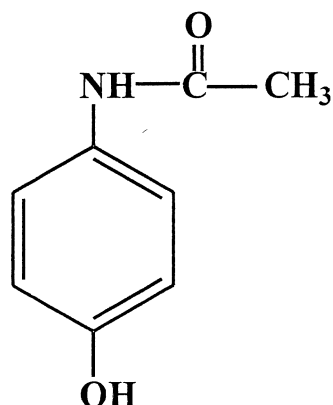
### **14. Phenol and Benzoic acid derivatives**

#### **Phenol derivatives**

## Anti-Fever Analgesic paracetamol

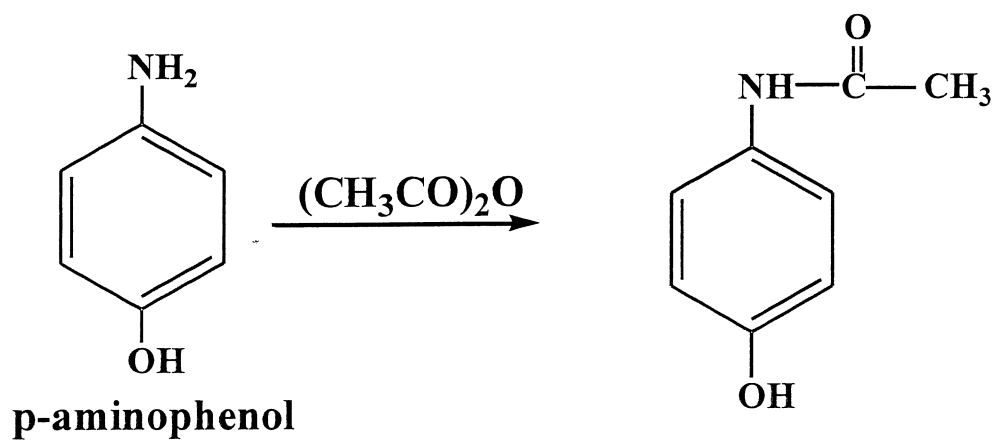


**P-Aminophenol**

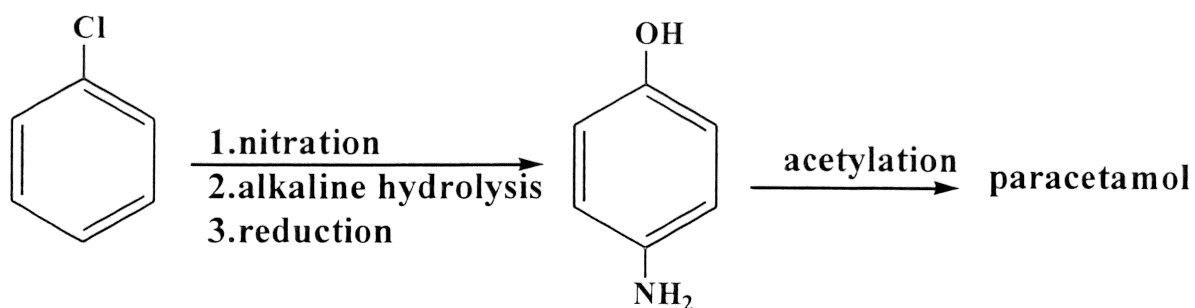


**Paracetamol**

## Synthesis of Paracetamol from p-aminophenol



## Synthesis of Intermediate, p-aminophenol from chlorobenzene



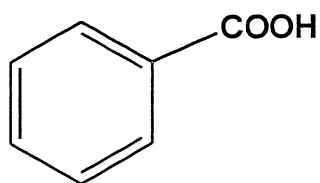
## Action and use of Paracetamol

- Analgesic ,fever reducing
- Devoid of anti-inflammatory and anti-rheumatic properties

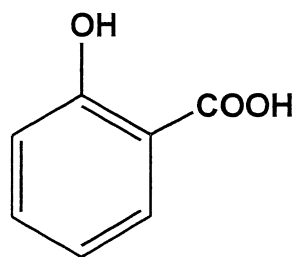
## Benzoic acid derivatives

- Orthohydroxybenzoic acid (salicylic acid)  
derivatives: Aspirin, Diflunisal
- p-aminobenzoic acid derivatives: Procaine...
- o-aminobenzoic acid (anthranilic acid)  
derivatives: mefenamic acid.....

### Salicylic acid



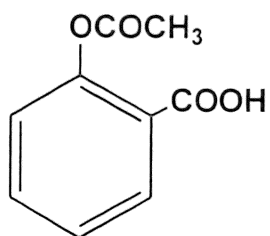
**Benzoic acid**



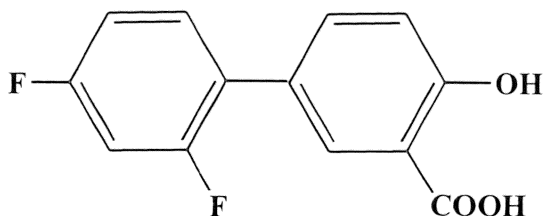
**Salicylic acid**  
(o-hydroxybenzoic acid)



## Salicylic acid derivatives

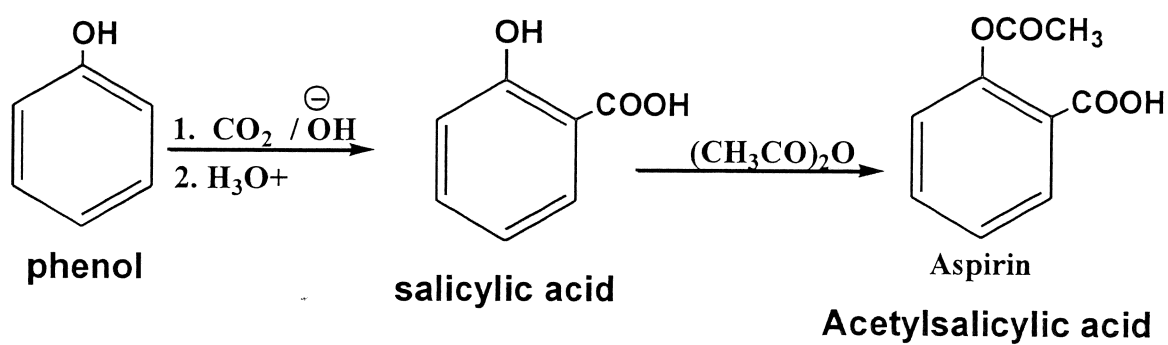


**Acetylsalicylic acid  
(Aspirin)**

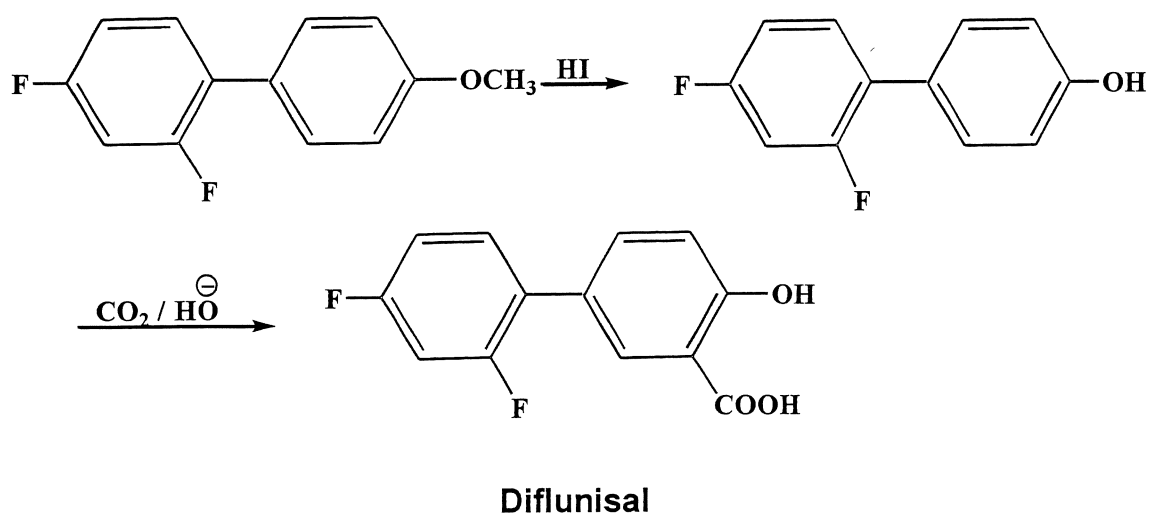


**Diflunisal**

## Synthesis of Aspirin



## Synthesis of Diflunisal



**2',4'-difluoro-4-hydroxy-3-biphenylcarboxylic acid**

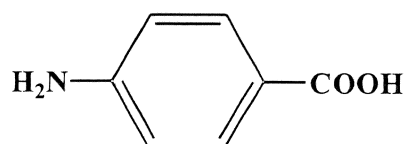
## Action and use of Diflunisal

- Analgesic, fever reducing and has anti-inflammatory action
- It is used in rheumatoid arthritis, osteoarthritis..
- Synonym for this drug: dolobid

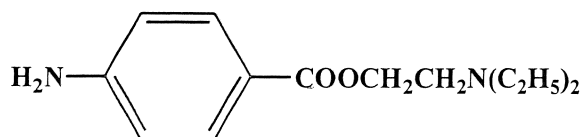
## Synthesis of p-aminobenzoic acid derivatives

- Local anesthetic Procaine
- Topical anesthetic Benzocaine
- Antiarrhythmic Procainamide
- Anti-emetic Metoclopramide

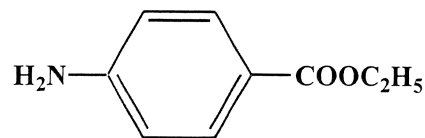
### p-Aminobenzoic acid derivatives



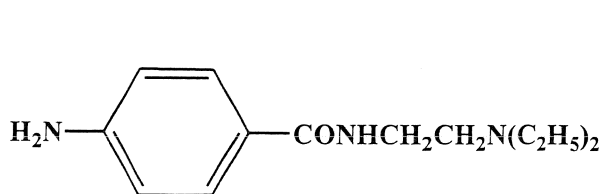
p-aminobenzoic acid



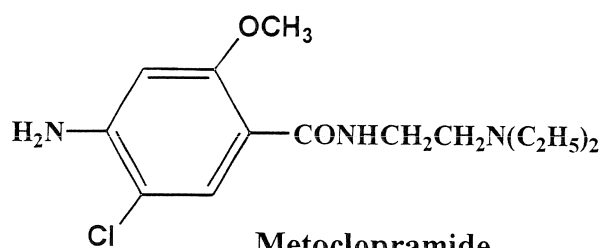
Procaine



Benzocaine

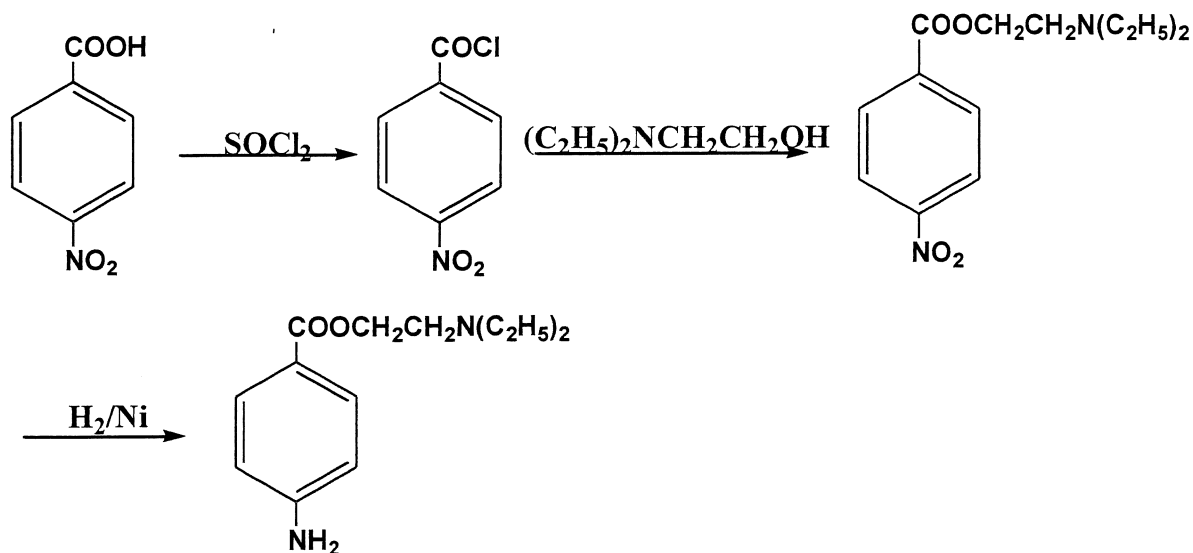


Procainamide



Metoclopramide

## Synthesis of procaine starting from p-nitrobenzoic acid



## Synthesis of topical anesthetic Benzocaine

1- From p-aminobenzoic acid

