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Faculty of Medicine | Department of Pharmacy  
First Year of Pharmacy  
Human Sciences History of pharmacy



# Major Therapeutic Discoveries

- Presented by:  
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# OBJECTIVES

- To know the major therapeutic discoveries that **marked the 19th century**

# OUTLINE

**Introduction**

- 1. Pain Medications**
- 2. Cardiac Glycosides**
- 3. Antibiotics**
- 4. Anticancer Agents**

**Conclusion**

# Introduction

- **Major therapeutic discoveries are a set of innovations**

  - that transformed the management of diseases

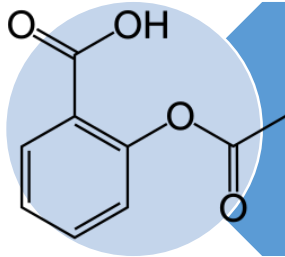
  - increased life expectancy.

- The 19th century is the century of discoveries and revolutions

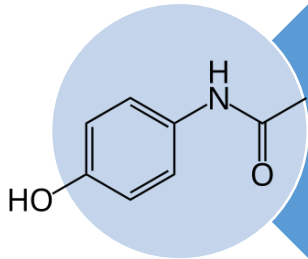
# 1. Pain Medications



## 1.1. Opioids (Morphinics)



## 1.2. Aspirin



## 1.3. Paracetamol (Acetaminophen)

# 1. Pain Medications

## 1.1. Opioids (Morphinics)



1806

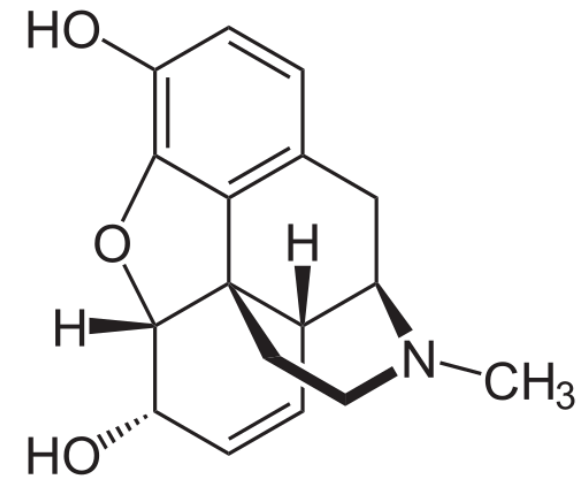
- Friedrich Sertürner
- Morphine extracted from the opium of the somniferous poppy



**Friedrich Sertürner**  
German pharmacist



*Papaver somniferum* L. Schlaf oder Betäubpfl.



Morphine

# 1. Pain Medications



## 1.1. Opioids (Morphinics)

1806

- Friedrich Sertürner
- Morphine extracted from the opium of the somniferous poppy

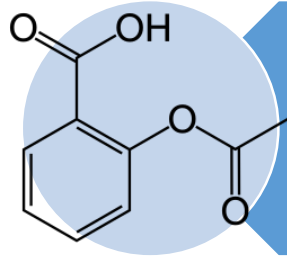
1832

- Robiquet
- Codéine (ether of morphine)

1848

- George Merck
- Papaverine

# 1. Pain Medications



## 1.2. Aspirin — Acetylsalicylic Acid

In the early 19th century

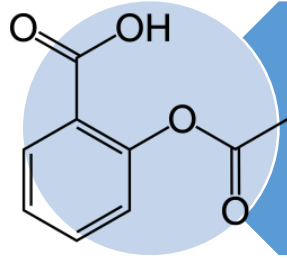
- Research on salicin extraction from willow bark completed



*Salix alba*

**White willow**

# 1. Pain Medications



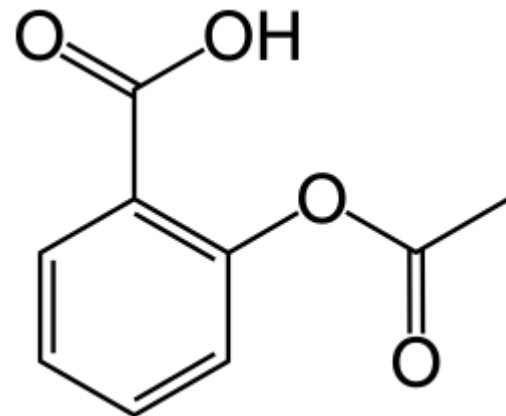
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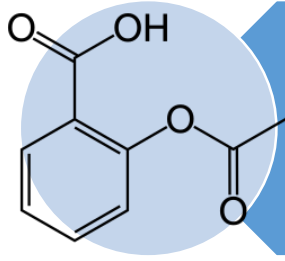
1853

- First synthesis of ASA by Charles-Frédéric Gerhardt



Acetylsalicylic Acide

# 1. Pain Medications



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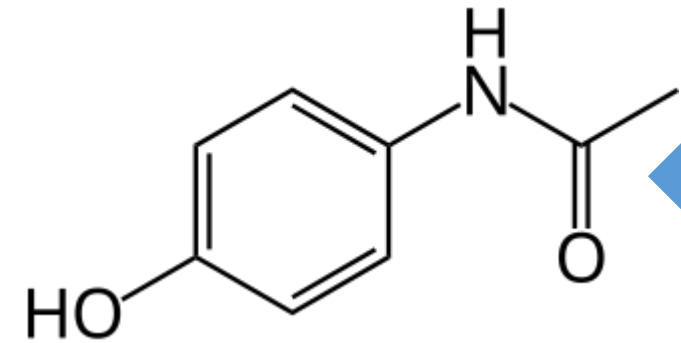
1897

- Félix Hoffmann synthesized acetylsalicylic acid, better tolerated by the stomach

1899

- Bayer patents "Aspirin"

# 1. Pain Medications



## 1.3. Paracetamol (Acetaminophen)

1845

- Charles Gerhardt — first synthesis of acetanilide by acetylation of aniline

1878

- First chemical synthesis of N-acetyl-para-aminophenol by Morse

1893

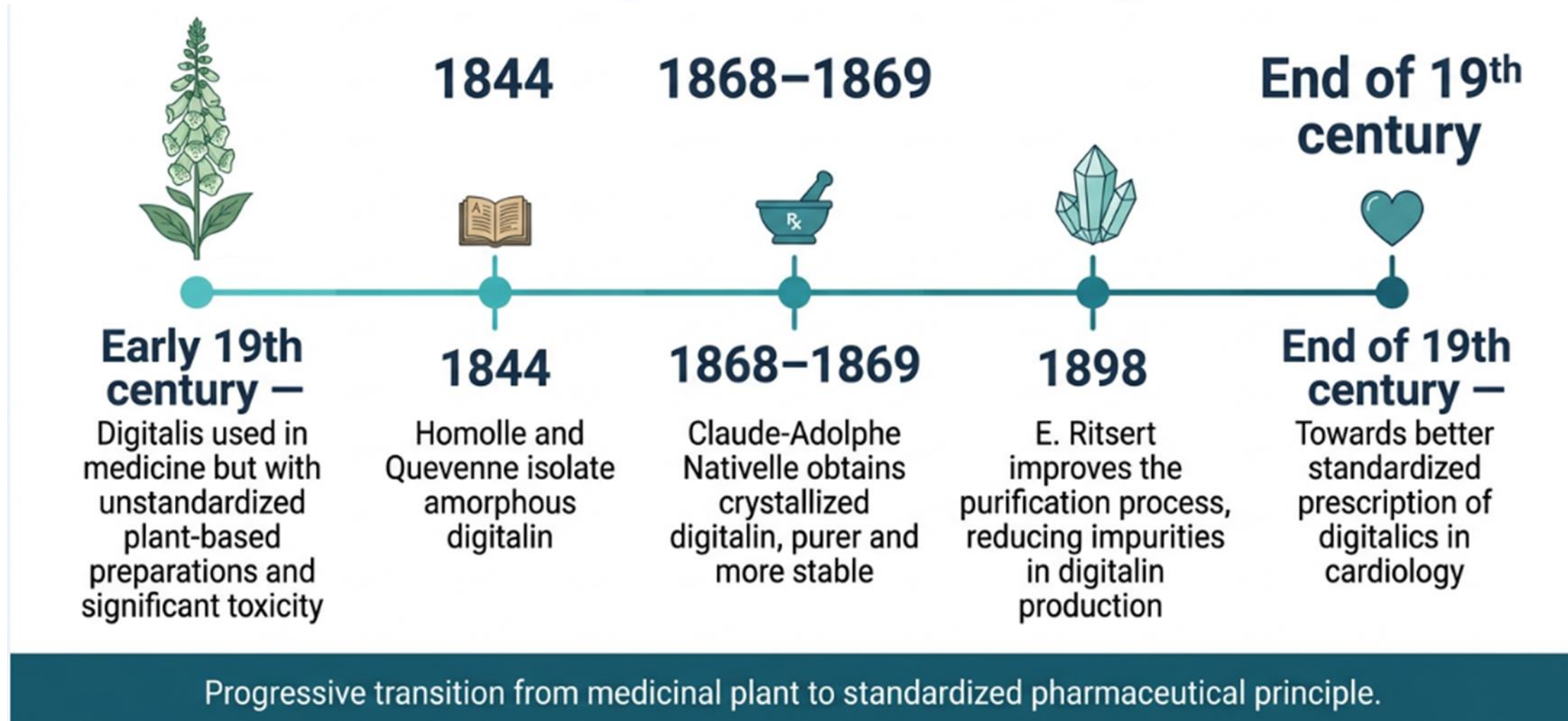
- Joseph Von Mering publishes the first clinical study

## 2. Cardiac Glycosides (Digitalics)



**Purple foxglove**

# 2. Cardiac Glycosides (Digitalics)

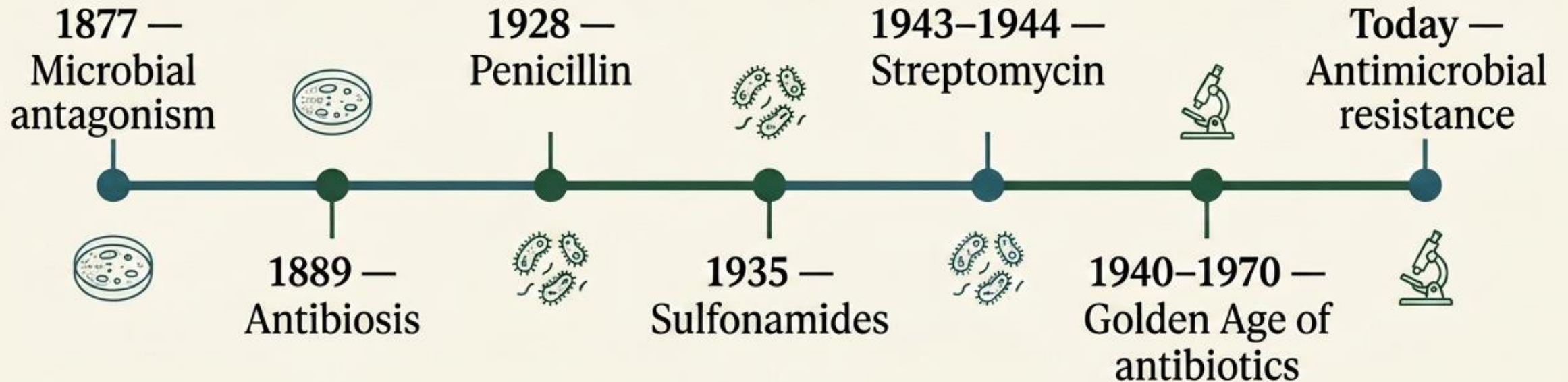


**Chronological overview of cardiac glycosides in the 19th century**

# 3. Antibiotics

## History of Antibiotics

Simplified chronological timeline



# 3. Antibiotics

## History of Antibiotics

Period / Date	Discovery / Concept	Key points
1877	Microbial antagonism	Pasteur and Joubert observe that one micro-organism can inhibit the growth of another.
1889	Antibiosis	Vuillemin formalizes the concept of antibiosis.
1909–1910	Salvarsan	Ehrlich develops the first major anti-infective chemotherapy.
1928	Penicillin	Fleming discovers penicillin produced by <i>Penicillium</i> .
1935	Sulfonamides	Domagk introduces Prontosil, the first antibacterial sulfonamide.
1943–1944	Streptomycin	First antibiotic effective against tuberculosis.
1940–1970	Golden Age	Discovery of many major antibiotic classes.
Since 1980	Antimicrobial resistance	Slowdown in new discoveries and emergence of resistance.

# 4. Anticancer Agents

## History of Anticancer Treatments

Period	Major Advance
19 <sup>th</sup> century	Surgery, cellular theory of cancer (Müller 1838, Virchow 1863)
1895–1899	X-rays (Röntgen), radioactivity (Becquerel), first cures by radiotherapy
1898	Radium (Marie & Pierre Curie) → brachytherapy
1909–1910	Concept of magic bullet (Ehrlich)
1940s	Nitrogen mustards: first cytotoxic agents
1950s	Antifolates (methotrexate), treatment of leukemias
1970s	Cisplatin, taxanes, anthracyclines
2000s–2010s	Targeted therapies and immunotherapies

# Conclusion

- The 19th century laid the foundations of modern pharmacology
- The study of major therapeutic discoveries of the 19th century contributes to understanding the development of modern pharmacy
- Many 19th-century innovations were still in their early stages (antibiotics and anticancer agents)

**Thank you for  
your attention**