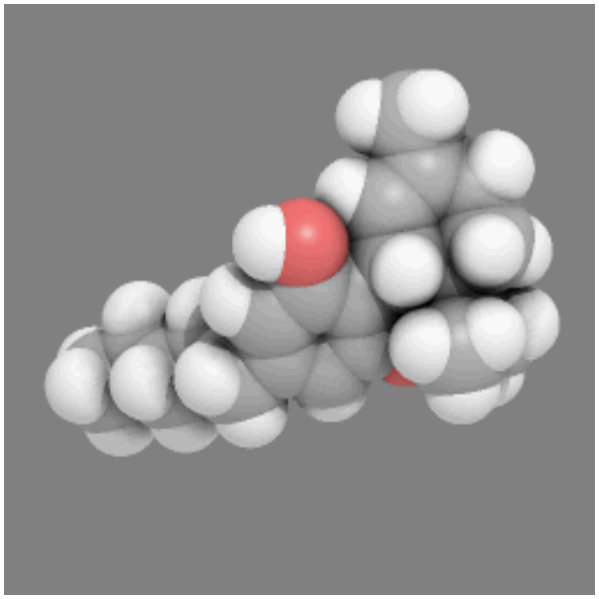
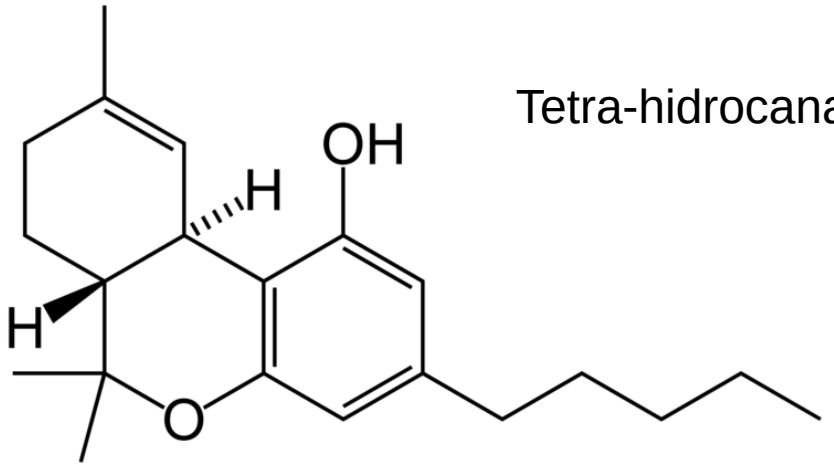
Grande parte dos Fármacos foi obtida, ou desenvolvida, a partir de produtos naturais

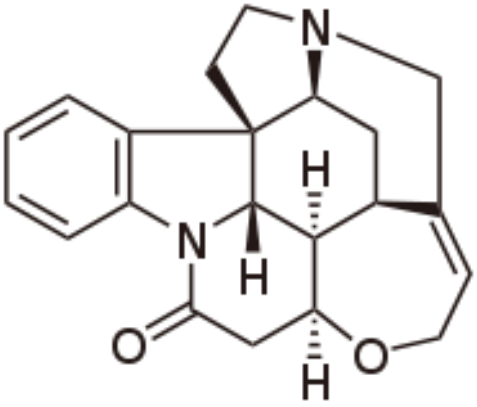




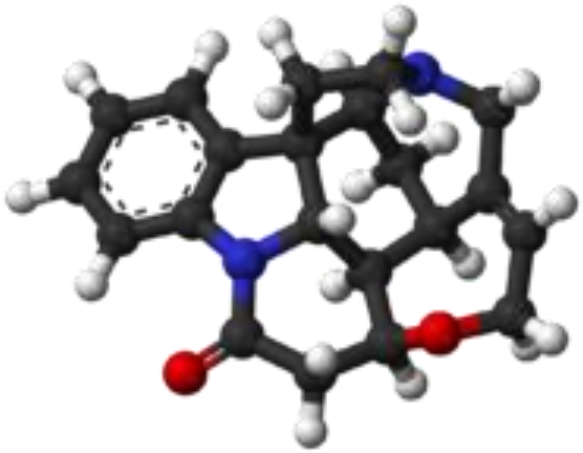
Tetra-hidrocanabinol

History

Structural elucidation of natural products used to be *very hard* and *take forever*.



Strychnine *alkaloid toxin*
Isolated by Pelletier & Caventou (1818)
Past: H. Leuchs worked on structure for 40 years until R. Woodward (1954) beat him to it.



Today: <1 mg sample needed; a weekend would be enough.

Etapas para elucidação estrutural

- Determinação da Fórmula Molecular
- Caracterizar Grupos funcionais
- Degradação da Molécula e Síntese de Derivados

Atualmente

- Métodos Espectroscópicos

STRUCTURAL ELUCIDATION

- ***Spectroscopic methods:***
- ***Infrared (IR)***

- indicates presence of functional groups:

C=O ~ 1670 – 1750 cm^{-1}

amide, ketone, ester

OH, NH/NH2 ~ 3100 cm^{-1} to 3500 cm^{-1}

Limitation; non polar and semi polar compounds only.

STRUCTURAL ELUCIDATION cont'd

- ***Mass Spectrometry***

- **Enables the determination of molecular weight.**
- **Aids structural elucidation – fragmentation peaks: loss of CO $(M^+ - 28)$, loss of H_2O $(M^+ - 18)$.**
- **Enables identification of mixtures; MS-MS.**
- **Various ionization techniques – to accommodate different compounds; polar, ionic, non-polar, macromolecules.**
- **Various Analyzers; usage (MS-MS, HRMS), cost.**

NUCLEAR MAGNETIC RESONANCE

- ***Nuclear Magnetic resonance:***
  - **Permits the establishment of the structural skeleton of the compound investigated.**
  - **^{1}HNMR showed resonances of protons while ^{13}C NMR showed the C resonances.**
  - **Allows to establish the connectivity between carbons and protons.**
  - **One dimensional and two dimensional techniques available:**
    - **COSY, HMQC, HMBC, NOESY etc.**
  - **For ^{1}HNMR ~ 1-5 mg (pure) sufficient**
  - **For ^{13}C NMR ~ 20 mg sufficient.**