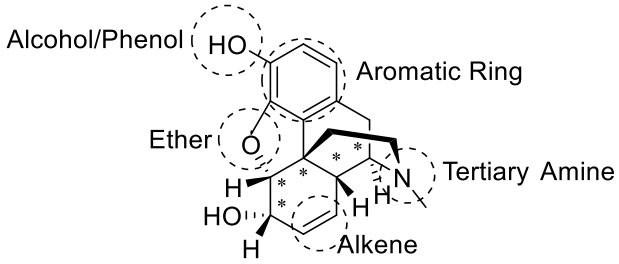
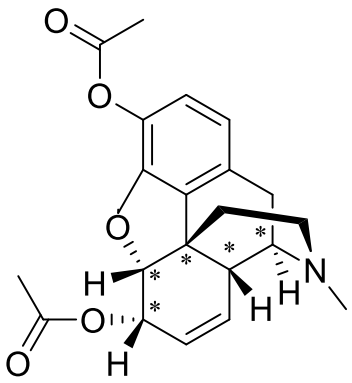
Review:



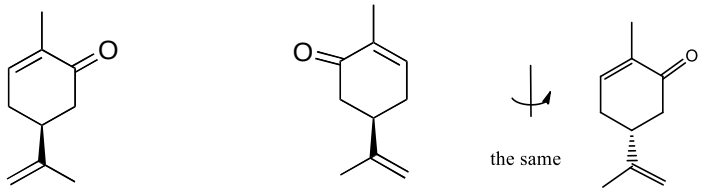
- Morphine (from Morpheus God of sleep)
- 5 Stereogenic Centers
- ~10% Opium is Morphine, from Poppy (Papaver somniferum)
- Analgesic and addictive
- Heroin is even more potent

Acetylated form is known as Heroin:



Optical Rotation:

Pure enantiomers rotate in equal but opposite directions.



enantiomers

$[\alpha]_D = +100$ $[\alpha]_D = -100$

Dextrorotatory D | Levorotatory L

Optical Purity = enantiomeric excess

↑ Measured ↑ Reality

- excess of one enantiomer over the other
-

Eg.Assume pure enantiomer has 100° rotation (pure R isomer = -100° ; S isomer = +100°)

R	S	Rotation (°)	Optical purity
100%	0%	-100	100%
75%	25%	-50	50%
50%	50%	0	0%
25%	75%	+50	50%
0%	100%	+100	100%

Racemic Mixture = Racemate

50 : 50 mixture of enantiomers $[\alpha]_D = 0$

$$\text{Optical purity} = \frac{[\alpha]_{observed}}{[\alpha]_{pure-enantiomer}} \times 100\%$$

Resolution: Separation of enantiomers.

- Always need chiral agents
- Physical separation (crystallization of specific enantiomer)
- "Reaction" with chiral substance to get 2 Diastereomers, which can be separated. To separate enantiomers, chiral reagents are needed.

Tartaric acid: