



# SYNTHESIS OF 2-PHENYL INDOLE

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## ABSTRACT

Acetophenone and phenyl hydrazine react in the presence of acid to get acetophenone phenylhydrazone. The acetophenone and phenylhydrazone undergoes Fischer indole cyclization reaction in the presence of acid to get 2-phenylindole. 2-phenyl indole are used as an anti-inflammatory and anti-Fungal and anti-bacterial and also used to prepare the organic light emitting diodes. This reaction was discovered in 1883 by Hermann Emil Fischer [1]

## KEYWORDS

Acetophenone, phenyl hydrazine, Fischer indole cyclization, organic light emitting diodes

## INTRODUCTION

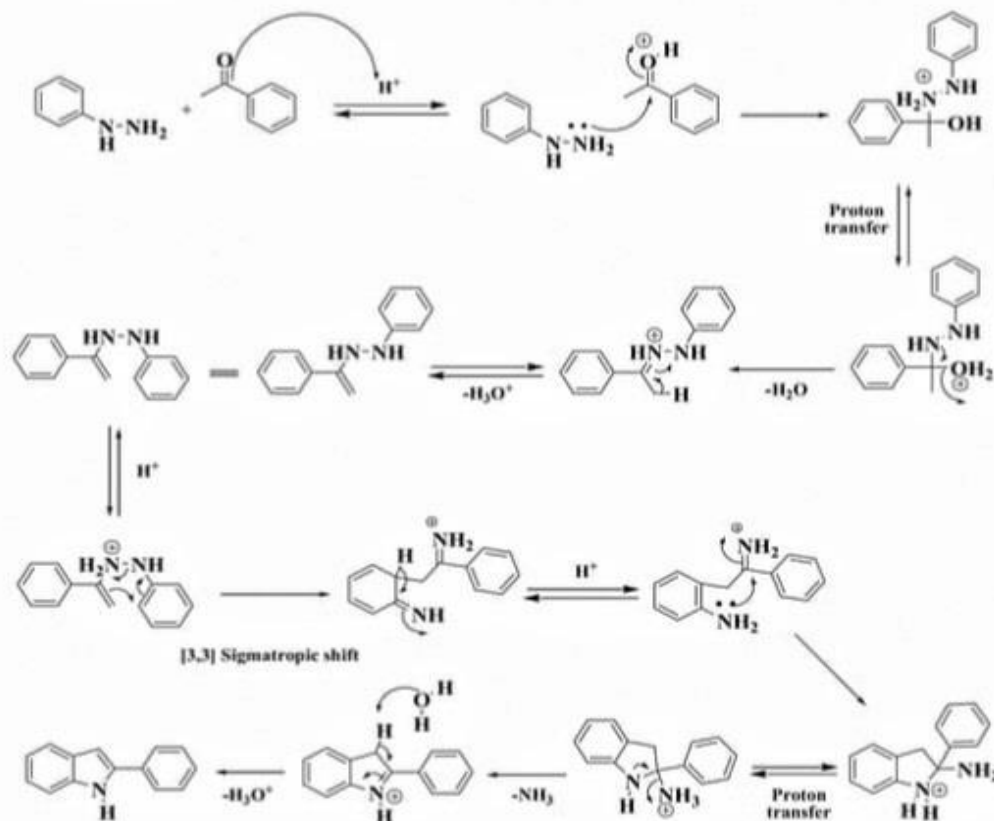
2-phenylindole is an organic compound which is parent structure of a group of non-steroidal selective estrogen receptor modulators (SERMS) It include zindoxifene, bazedoxifene pipendoxifene and also nonsteroidal estrogen D-15414 [2] Basically 2 phenyl indole belongs to the class of organic compounds known as indoles, which are bicyclic aromatic compounds containing a pyrrole ring fused to a benzene ring. It is commonly used in organic synthesis and pharmaceutical research due to its versatile properties. It has been studied for its potential applications in drug development and as a building block for the synthesis of various compounds. Researchers have found it to be useful in the development of new pharmaceuticals and as a building block for creating other compounds

### Indole derivatives are used as

- Anti-microbial
- Anti-inflammatory
- Anti-depressant/ Anti- psychotic
- Anti-cancer
- Anti – viral
- Analgesic



## MECHANISM



## PROECDURE

- First prepare acetophenone phenylhydrazone by boiling a mixture of 20 g (0.167 mol) of acetophenone and 18 g (0.167 mol) of phenyl hydrazine with 60 ml ethanol and a few drops of glacial acetic acid.
- Filter the cold reaction mixture and wash the solid with dilute hydrochloric acid followed by. about 12 ml of cold rectified spirit
- Recrystallize a small part of ethanol and thus obtain a sample of pure acetophenone and we get phenylhydrazone as a white solid and the melting point is 106 °C.
- Place 28 g of the crude phenylhydrazone in a 250 ml beaker containing 180 g of polyphosphoric acid and then heat on a boiling water bath, stir it with a thermometer and maintain a temperature at maximum 100-120 °C for 10 min The reaction is exothermic
- Add 450 ml of cold water and stir well to complete solution of the polyphosphoric acid and then filter at the pump and wash with water.
- Boil the crude solid under the reflux along with 300 ml of rectified spirit then add a little decolorizing charcoal in it and filter through a preheated Buchner funnel
- Wash the residue with 40 ml of hot rectified spirit and cool the combined filtrates to room temperature, filter off the 2-phenylindole and wash it three times with 10 ml portions of cold alcohol.
- Dry a sample obtained in a vacuum desiccator over anhydrous calcium chloride. The yield of pure 2-phenylindole [3]



**POWDER OF 2-PHENYL INDOLE**

## PROPERTIES

2-phenylindole is an organic compound which is parent structure of a group of non-steroidal selective Estrogen receptor modulators (SERMS) It include zindoxifene, bazedoxifene, piperdioxifene and nonsteroidal estrogen D- 15414

IUPAC Name	2-phenyl-1H-indole
Chemical Formula	C <sub>14</sub> H <sub>11</sub> N
Molar mass	193.249 g.mol <sup>-1</sup>
Melting point	188-190 °C (lit.)
Boiling point	250 °C/10 mmHg (lit.)
Density	1.1061 (rough estimate)
Refractive index	1.5850 (estimate)
Flash point	250°C/10mm
Storage	in dry, Room Temperature
Form	Powder
Pka	16.80±0.30(Predicted)
Color	Off-white to beige or slightly green
Color	it is usually white to light
Odor	odorless
Solubility	sparingly soluble in water, soluble in organic solvent like ethanol almost transparency in methanol, dichloromethane

## Similar names for 2-phenylindole

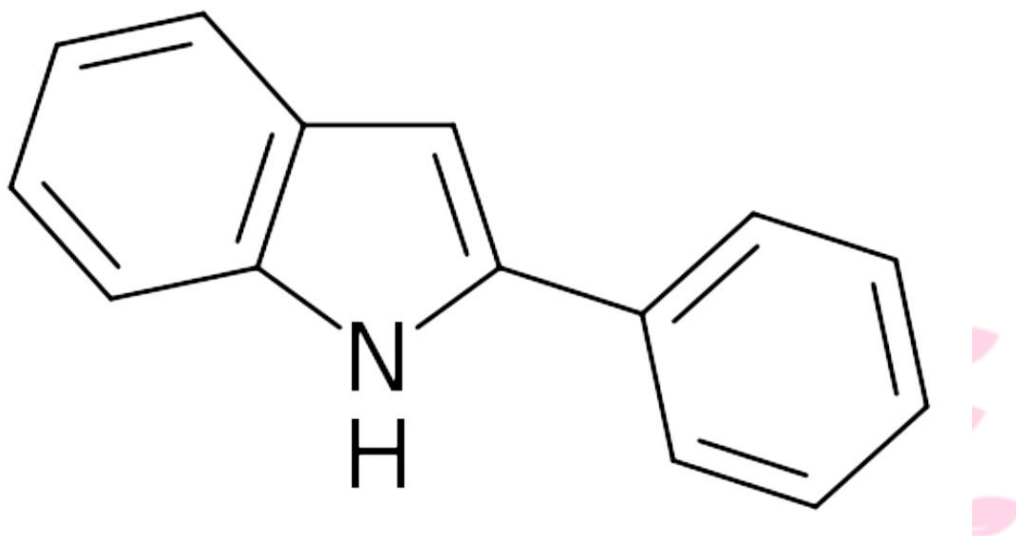
2-phenyl-1H-indole

1H-indole-2-phenyl

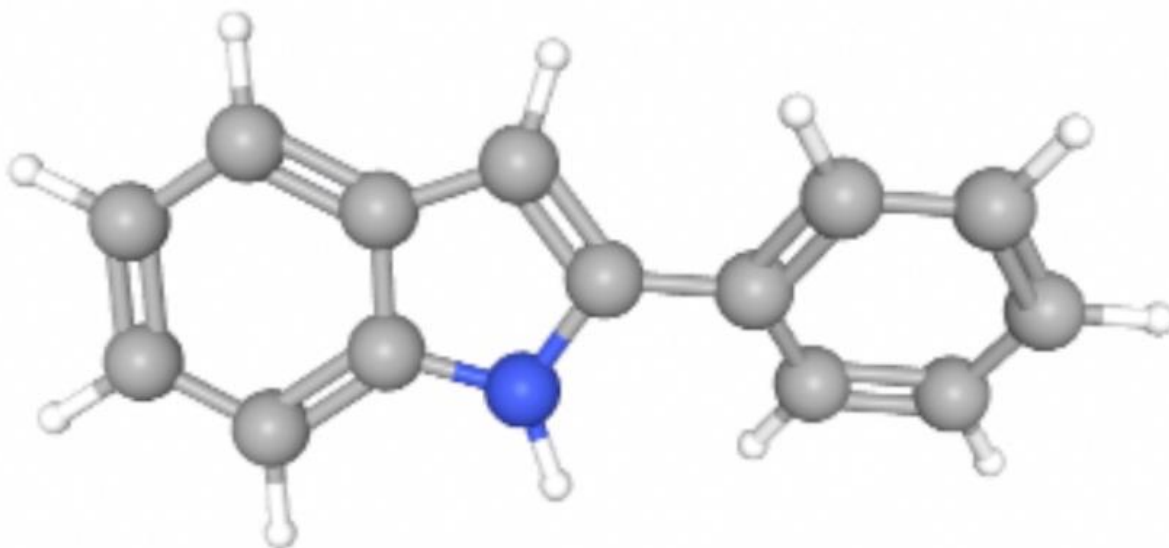
Indole, 2-phenyl

Alpha phenylindole

**Chemical structure:**



**2D STRUCTURE OF 2-PHENYLINDOLE**



**3D STRUCTURE OF 2-PHENYLINDOLE**

**Journal uses:**

2-phenylindole is used as an anti-inflammatory agent.

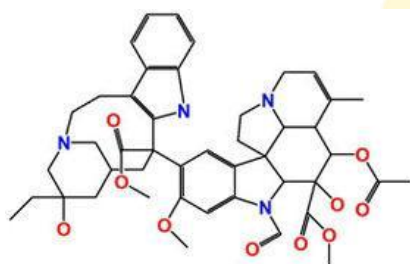
It can also be used as an anti-fungal agent. It can also be used as an antibiotic agent.

2-phenylindole also used in the preparation of organic light emitting diodes.[4]

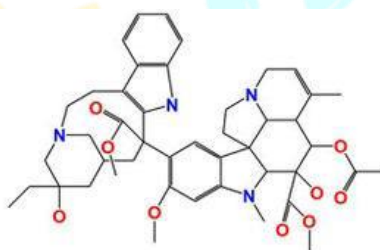
## Marketed drug for various pharmaceutical activities having indole:

### ANTI-CANCER

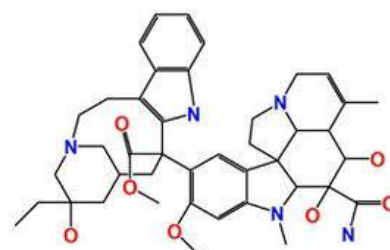
- Vincristine
- Vinblastine
- Vindesine
- Mitraphylline
- Cediranib
- Panobinostat



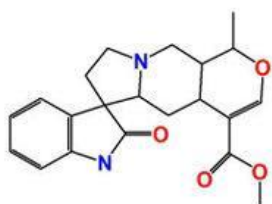
Vincristine



Vinblastine



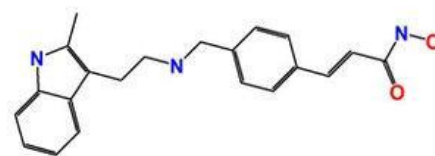
Vindesine



Mitraphylline



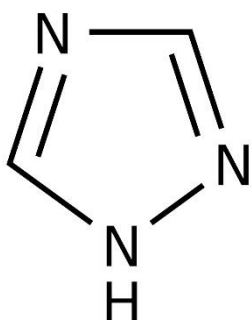
Cediranib



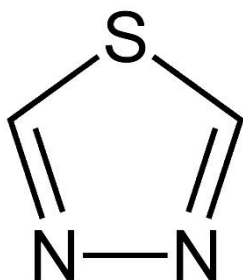
Panobinostat

### ANTI- MICROBIAL

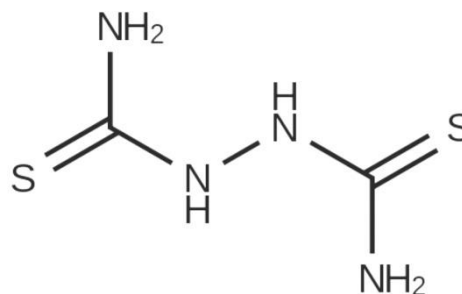
- 1,2,4-Triazole
- 1,3,4-Thiadiazole
- Carbothioamide



1,2,4-Triazole



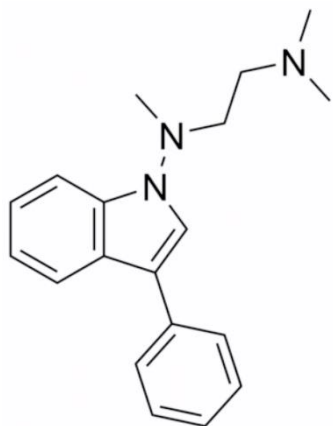
1,3,4-Thiadiazole



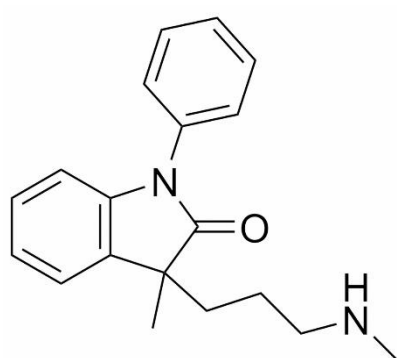
Carbothioamide

## ANTI-DEPRESSANT

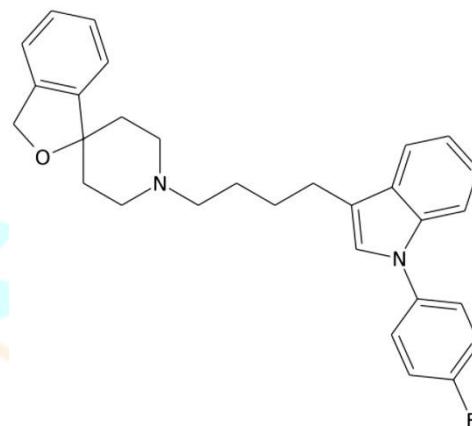
- Binedaline
- Amedaline
- Siramesine
- indalpine



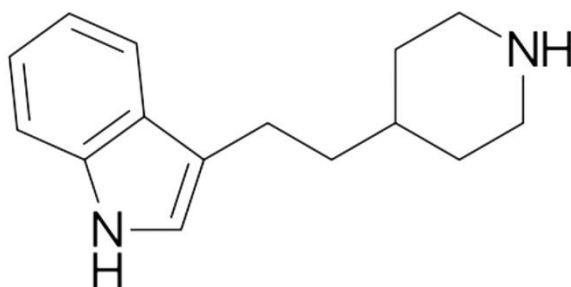
**Binedaline**



**Amedaline**



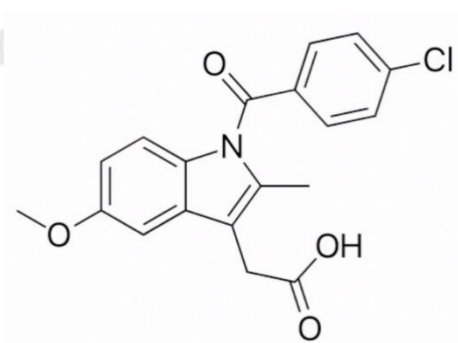
**Siramesine**



**Indalpine**

## ANTI-INFLAMMATORY

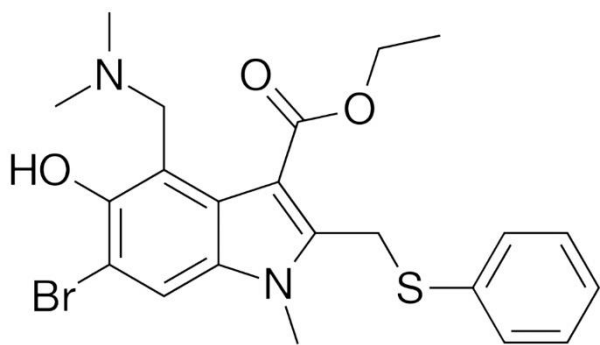
- Indomethacin



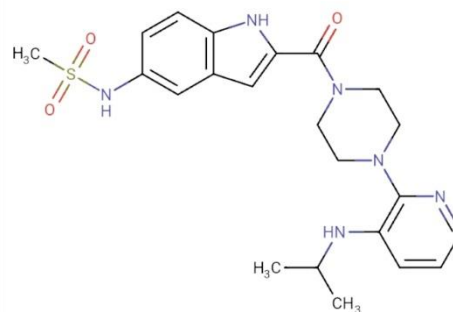
**Indomethacin**

## ANTI-VIRAL

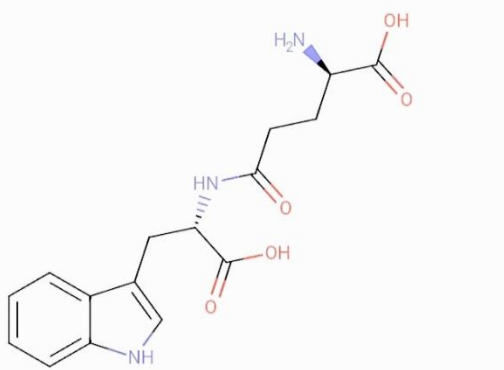
- Arbidol
- Delavirdine
- Golotimod
- Panobinostat



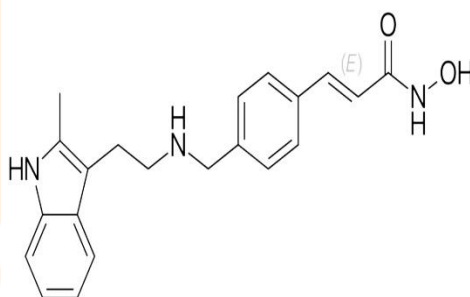
**Arbidol**



**Delavirdine**



**Golotimod**

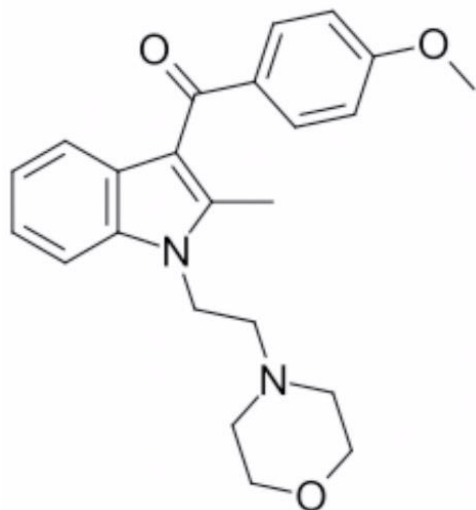


**Panobinostat**



**ANALGESIC**

- Pravadoline

**Pravadoline****REFERENCES :**

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