Drug Design and Effectiveness of Tramadol

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Drug Design and Effectiveness of Tramadol

**Background**
- Used as opioid analgesic since 1970’s
- Diversion & abuse reportedly low
- Found in Nauclea latifolia naturally

**Organic Chemistry**
- Racemic mixture of trans isomer
- Has two enantiomers
- Derivatives and metabolites
- IUPAC name
  - (1S, 2S)-2-[(dimethylamino)methyl]-1-(3-methoxyphenyl)cyclohexan-1-ol

**Design**
- Structure components
  - 2 rings to last longer
  - Alcohol for rapid absorption
  - Amine help with complementary mechanism
  - Ester help with complementary mechanism

**Nonmedicinal Ingredients**
- Carnauba wax
- Cornstarch- white color
- Hypromellose- gelation property
- Magnesium stearate
- Microcrystalline cellulose
- Polyethylene glycol
- Polysorbate 80
- Titanium dioxide

**Mechanism Information**
- 1st binding of Tramadol and O-desmethy tramadol to μ-opioid receptor (7)
- 2nd, weak inhibition reuptake of serotonin and norepinephrine (7)
- Lower percentage of drowsiness than pethidine (5)
- Least evidence of abuse
- Higher percentage of bioavailability than pethidine (5)

**Conclusion**
Overall, we can start to understand the drug tramadol and how beneficial it is. We can now see how aspects of the drug relate to topics in organic chemistry. The medical ingredient tramadol has a unique structure with functional groups that contribute to the drug’s success. Nonmedicinal ingredients help with being able to consume the drug orally. The actions to move tramadol through the human body and how it’s more effective than other analogues allow us to notice and appreciate the development of it. Hopefully the pain reliever, tramadol, will continue to advance and be used more frequently.

**References**