e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:05/Issue:10/October-2023 Impact Factor- 7.868 www.irjmets.com

ASSESMENT OF DRUG RELATED PROBLEMS

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DOI : https://www.doi.org/10.56726/IRJMETS45243

ABSTRACT

Drug-related problems could significantly affect the clinical results in critically ill patients. Due to frequent medication-related occurrences and difficult clinical courses, critically ill patients are typically thought to be more prone to harm from drug-related problems. Drug-related problems (DRPs) are common during hospitalisation as there may be multiple modifications to the patient's drug regimen and a lack of continuity of treatment. The purpose of the current study was to evaluate the pharmacist interventions in a teaching hospital for tertiary care, identify DRPs, drug classes involved in DRPs, and associated factors with their incidence.

The business of producing illegal drugs is increasing, and India has turned into a place where they are dumped. All of the formulations are intended for the prevention or treatment of illnesses and diseases, but only a small number of the medications are actually necessary for survival; the remainder are merely substitutes for one another. Due to a lack of law enforcement physician awareness and the drug control authorities' failure to tell all hospitals of the status of medicine, prohibited drugs are still accessible in developing nations like India. Some of the hazardous medicines have been banned globally, currently they are still available in India. The US FDA has banned the most popular over-the-counter medications, including NIMESULIDE, FURAZOLIDONE, PHENYLPROPANOLAMINE, because of their negative effects on the kidney, liver, and nervous system. Here in the review paper we try to cover some drugs which are banned in India and other countries with there ADR/ DPR's.

Keywords: Drug Related Problems [DPR's], Banned Drugs, NIMESULIDE ,Adverse Drug Reaction, India.

I. INTRODUCTION

Drug Related problems (DRP's) is shown in the patient who still get the drug or the medicine which are banned in other countries but available in India. These are those problems which shown after some time of medicine intake. Patient may suffer from these conditions if the medicine is taken for long time or short time period.

- **What is 'Drug'....?**

A drug is defined as "a chemical or synthetic substance used in the treatment, diagnosis, or prevention of disease or used in any other way to promote physical or mental well-being.

A drug Is something that affects your body. Drugs must to pass through the body and into the brain.

In pharmacology, a pharmaceutical drug called a medication or medicines

It is a chemical substance used

To treat, cure, prevent, or diagnose a disease

- **Banned Drugs:-**

Banned drugs are those that are illegal to use because they could be used to enhance performance artificially and exhibit a variety of adverse impacts in addition to their intended therapeutic effects. Whose manufacture or use is restricted or forbidden by prescription.

The highest authority in India to increase clearance of any drug or to impose a drug ban is known as the **"Drug Controller General of India."** Some of the harmful medicines have been banned globally, yet they are still available in India.

The most common are like NIMESULIDE, PHENYLPROPANOLAMINE, FURAZOLIDONE, ASTEMIZOLE, VICKS ACTION 500 etc. **[1]**

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- **Reason for banning the drugs:-**

Prior to being released onto the market, drugs are put through extensive testing. The drug's safety and efficacy profiles are examined. Despite this, a class of side effects known as PHARMACOVIGILANCE occurs only when a medicine is made available.

Some drug show their side effects/ ADR/ DRP's after some time of drug taken later this action of banning is taken by the CDSCO.

- **PHARMACOVIGILANCE:-**

PHARMACOVIGILANCE is the branch of pharmacology that deals with the identification, evaluation, comprehension, and mitigation of unfavourable effects, notably long-term and transient side effects of drugs. **[2]**

- **Role of CDSCO:-**

The CDSCO of India is main regulatory body for regulation of pharmaceutical, medical devices and Clinical Trials.

Head office of CDSCO is located in NEW DELHI and functioning under the control of Directorate General of Health Services, ministry of health and family welfare Government of India.

- **Function of CDSCO**

1. Approval of new drug.
2. Prohibition of cosmetics and narcotics.
3. Clinical trials and new drug approval.
4. Import Licencing and Registration.
5. The release of the Indian Pharmacopoeia.
6. Keeping an eye on adverse drugs reactions.
7. Advice about technical issues.
8. Central Labs' drug testing
9. D&C Act and Rules Amendment. **[3]**

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➢ **Here is the list of other drugs which are banned in India and other countries with there reasons:-**

Drug Name (Brand name, drug class)	Pharmacol category (use)	Manufacturer	Year of drug		Reason for withdrawal
			Release	Indian ban	
Astemizole (Hismanal, 2nd gen antihistamine)	Antihistamine (allergies)	Janssen Pharmaceutical	1997	2003	Rare but fatal QT interval prolongation and related arrhythmia resulted in a market withdrawal in 2003[10,11]
Cisapride (Propulsid, 5-HT_4 agonist)	Gastroprokinetic (antiemetic)	Janssen Pharmaceutical	1980	2011	Rare but fatal QT interval prolongation and related arrhythmia lead to issue of warning letters by US FDA and withdrawal in 2000 and in India in 2011[10,11]
Diclofenac (Voltaren, NSAIDS)	Analgesic (pain relief)	Novartis	1973	2008	Liver toxicity in vultures and hence banned for animal use in India in 2008[10,11]
Phenformin (Biguanide, Chlorformin in India)	Antidiabetic	Marketed by Ciba-Geigy (DBI)	1957	2003	Lactic Acidosis in the late 1970s which was fatal in 50% of cases and hence banned from the Indian market in 2003[10,11]
Terfinadine (Seldane, 2nd gen antihistamine)	Antihistamine (allergies)	Sanofi-Aventis	1985	2003	Liver damages and severe cardiovascular complications resulting in withdrawal from the US, Canadian and Indian market in 97, 99 and 2003, respectively[10,11]
Gatifloxacin (Tequin, 4th gen fluoroquinolone)	Antibacterial (respiratory tract infections)	Bristol-Myers Squibb	1999	2011	Diabetes risk reported in a Canadian study published in NEJM 2006[12] led to a FDA black box warning in 2006[13] and withdrawn from Indian market in 2011[11,14]
Rosiglitazone (Avandia, thiazolidinedione)	Antidiabetic	GSK	2006	2010	Increased risk of heart attacks by 43% and subsequent deaths led to a US FDA alert in 2007[12,15] Suspension by the EMA in 2010 and withdrawal by India and New Zealand in 2011[16]
Tegaserod (Zelnorm, 5-HT_4 agonist)	Gastric motility stimulant (IBS and constipation)	Novartis	2002	2011	Banned globally due to 10 fold increase in risk of heart attacks and strokes in 2007 and withdrawn from Indian market after a report DTAB in 2011[10,11,17]
Nimesulide (Nimed, Nimedex, Nimesil, Nimulid, Nimutab, Nimdase, Nimopen-MPIndia (COX-2 selective NSAID)	Analgesic (acute pain, osteoarthritis and primary dysmenorrhea)	Helsinn Healthcare (original developer), By Dr. Reddy's Labs and Piramal Healthcare, India	1985	2011	liver toxicity and increased number of reports of adverse drug reactions in children led to its withdrawal in India in 2011 for pediatric use[11,18-20]
Sibutramine (Meridia, related to amphetamines)	Antiobesity (for anorexia)	Inventor is Knoll Pharma followed by Abbott	1998	2011	Increased heart attacks, strokes, and cardiac arrest led to withdrawal from the Indian market in 2010[11,21]
Rofecoxib (Viox, NSAID)	Analgesic (osteoarthritis, acute pain, dysmenorrhoea)	Merck & Co	1999	2004	Increased risk of heart attack and stroke on long term use in high doses led voluntary withdrawal by Merck from the US market and in India agreement between Union Ministry of Health and Welfare and the National Pharmacovigilance Advisory Committee in 2004[11,22]
Valdecoxib (Bextra, NSAID)	Analgesic (to treat osteoarthritis, rheumatoid arthritis, and painful menstrual symptoms	Pfizer	2001	2005	Increased risk of heart attack, stroke, serious and sometimes fatal skin reaction led to market withdrawal in the US by its FDA in 2005 and in India in 2005 upon a report submitted to the National Pharmacovigilance Advisory Committee (NPAC)[10,11,23,24]
Letrozole (Femara, nonsteroidal aromatase inhibitor)	Antineoplastic (Hormonally responsivebreast cancer after surgery and in postmenopausal women and infertility)	Novartis	2007	2011	Severe genetic abnormalities in babies born to infertile women led the Indian Union health ministry to withdraw the drug in 2011 after approving it for infertility therapy in 2007[10,11,25]
Rimonabant (Acomplia, selective cannabinoid CB-1 receptor antagonist)	Antiobesity (Reduce hunger and appetite for weight reduction)	Sanofi Aventis	2006	2009	Serious suicidal tendencies led the European drug regulator and the National Health Regulator to recall in 2009 and in 2009 in India in agreement between the Health Ministry and DTAB[10,11,26]

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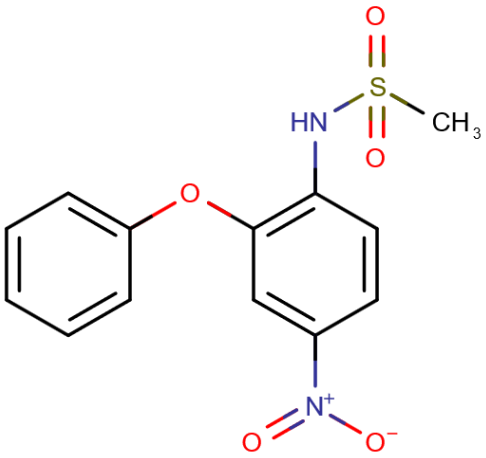
1. Nimesulid

Nimesulide is Analgesic drug which is used for the acute pain , osteoarthritis and primary dysmenorrhea.

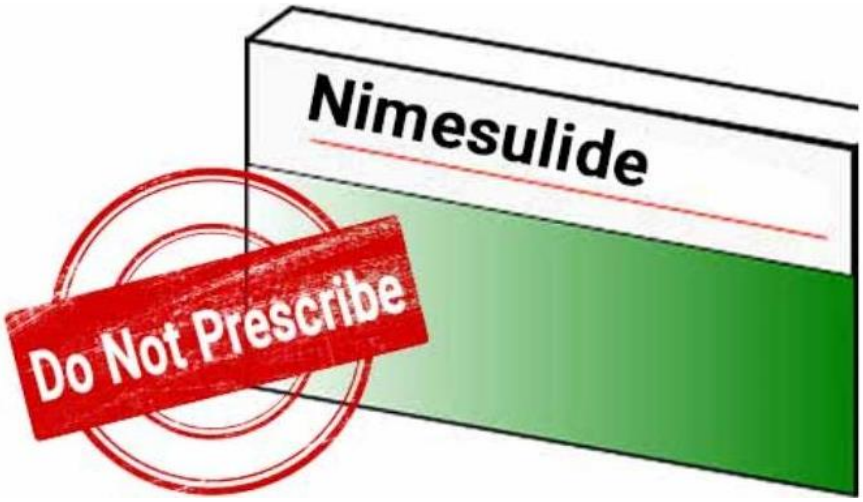


This drug is manufactured by Helsinn Healthcare (original developer) by Dr. Reddy`s Lab and Priamal Healthcare India in 1985.

This drug is banned in India in 2011due to its liver toxicity and increased in number of report of adverse drug reaction in children lead to its withdrawal in pediatric use.

Molecular weight:- 308.31g/mol

Molecular Formula:- $C_{13}H_{12}N_2O_5S$ **[4]**



➢ **Introduction:-**

Many countries have banned the use of Nimesulide. Yet it is still sold over the counter in India. The proper use of prescribed medications is a major issue in the medical field. The NSAIDs (Non-Steroidal Anti-Inflammatory Drugs) are one group of medications that receives a lot of scrutiny. Over the past few years, Nimesulide, one of the NSAIDs, has been attracting a lot of attention.

Nimesulide, a cyclooxygenase-2 inhibitor (COX-2) NSAID, has been the focus of significant debate ever since it was introduced in 1985 in Italy due to its reported side effects.

A number of nations have banned this drug due to concern about its side effects. **[5,6,7]**

On the one hand, clinical evidence have shown that Nimesulide is a safe and efficient NSAID, with the added benefit of having fewer gastrointestinal side effects because of its COX-2 selectivity.

Still, a number of studies have shown that Nimesulide might cause major adverse drug reactions (ADRs).

Some researchers claim it can Cause extensive liver damage and rarely, death due to Fulminant hepatic failure. **[8,9,10]**

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1. Astemizole

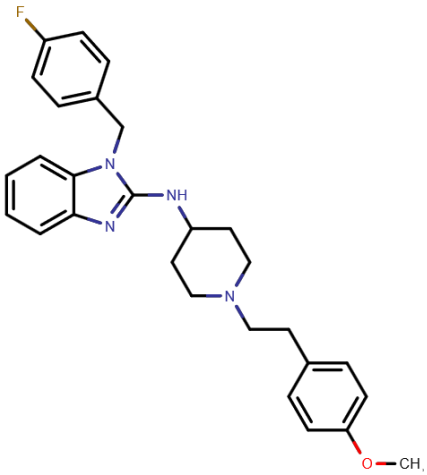
➢ **Background**

Astemizole is an Antihistamine medication that was used to treat allergies and hay fever [Antihistaminic]. It was withdrawn from market by the manufacturer in 1999 due to the potential to cause arrhythmias at high doses, especially when taken with CYP inhibitors or grapefruit juice.

The drug was released in 1997 and banned in India in 2003

The Manufacturer of the drug is Janssen Pharmaceutical

A second generation long-acting antihistamine called astemizole is used to alleviate allergy symptoms without sedating the user. The manufacturer pulled it off the market in 1999 because it had the potential to induce arrhythmias at high doses, particularly when used with CYP inhibitors or grapefruit juice.



Molecular Weight:- 458.5703g/mol

Molecular Formula:- $C_{28}H_{31}FN_4O$.

➢ **Mechanism Of Action (MOA):-**

In the GI tract, uterus, major blood arteries, and bronchial muscle, astemizole and histamine compete for binding at H1-receptor sites. Astemizole reversible binding to H1-receptors prevents the development of oedema, flare-ups, and pruritus brought on by histaminic activity. The amount of CNS depression is limited since the medication has a difficult time crossing the blood-brain barrier and prefers to bind to H1 receptors outside of the brain. Astemizole may also have negative consequences via interfering with H3-receptor function.

➢ **Adverse Effects Of Astemizole:-**

When the QT interval is prolonged, it increases the risk of developing a specific type of arrhythmia called Torsades de Pointes. TdP is characterized by rapid, irregular heartbeats that can potentially degenerate into a life-threatening ventricular fibrillation. **[11]**

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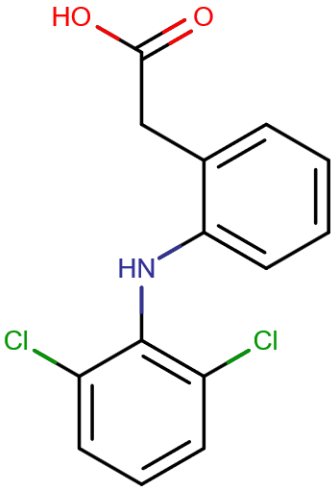
2. Diclofenac

Diclofenac is a nonsteroidal anti-inflammatory drug (NSAID) that is commonly used to relieve pain and reduce inflammation.



Molecular formula:- C14H11Cl2NO2

Molecular Weight:- 296.149g/mol.

➢ **Mechanism Of Action (MOA):-**

1. Mechanism of action: Diclofenac works by inhibiting the production of prostaglandins, which are substances in the body that cause pain and inflammation. It does this by blocking the enzyme cyclooxygenase (COX), which is responsible for the synthesis of prostaglandins.

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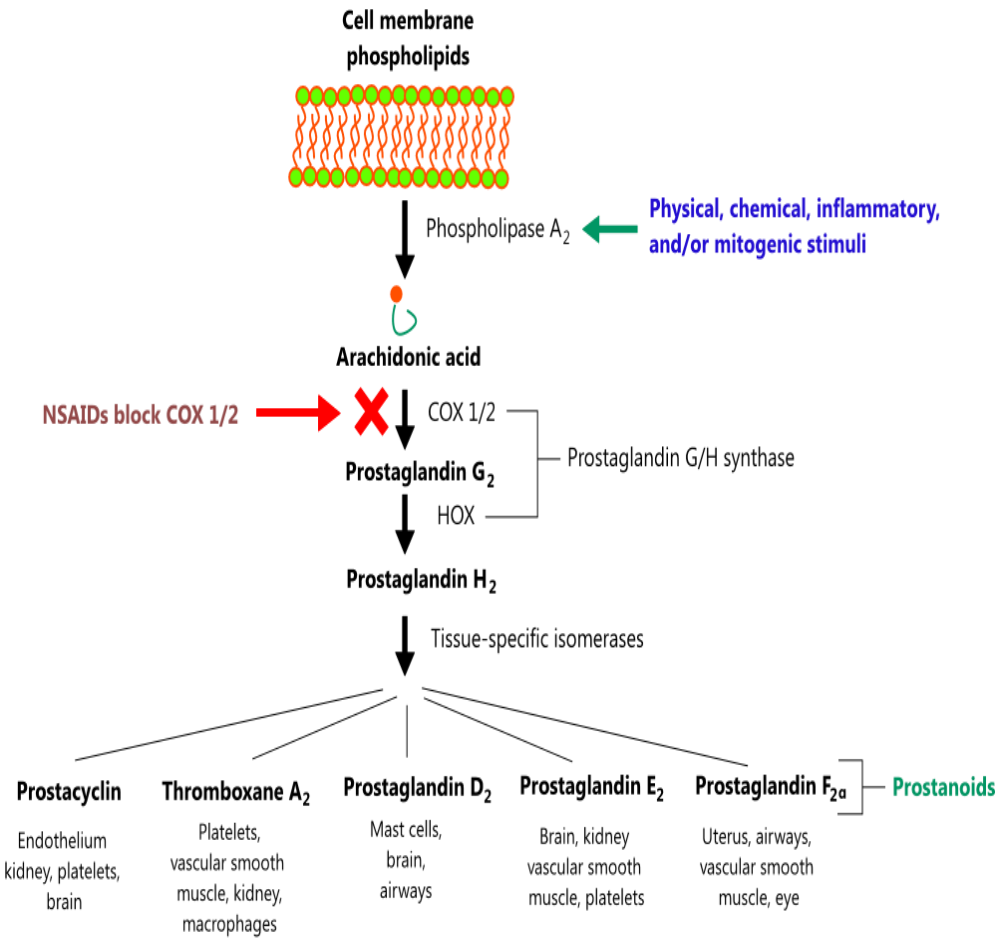
NSAID Mechanism of Action



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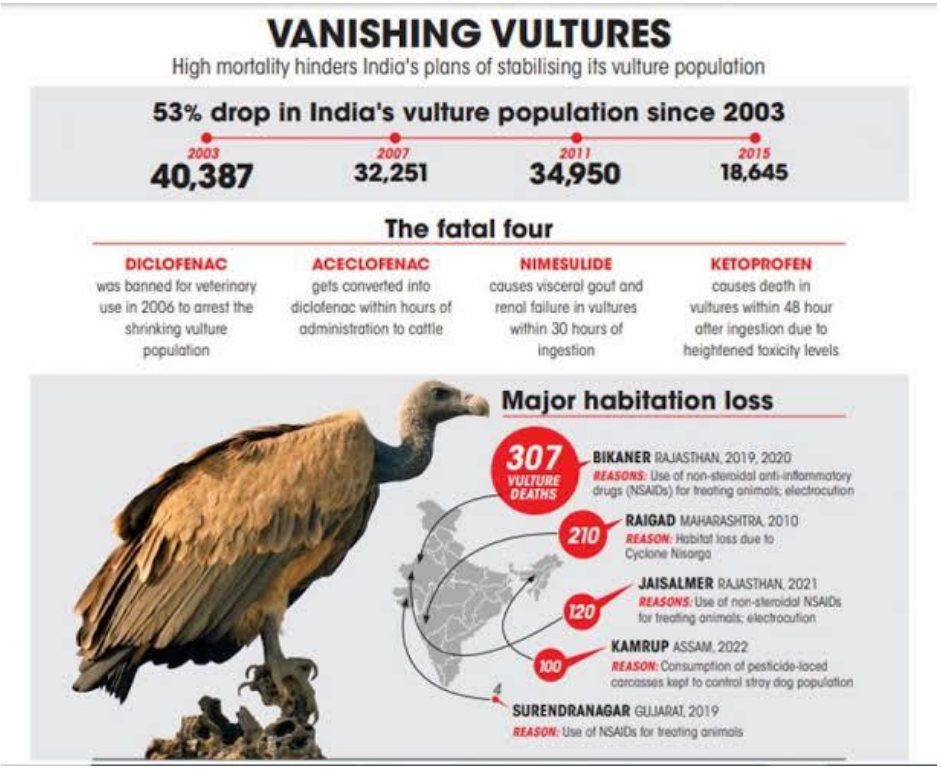

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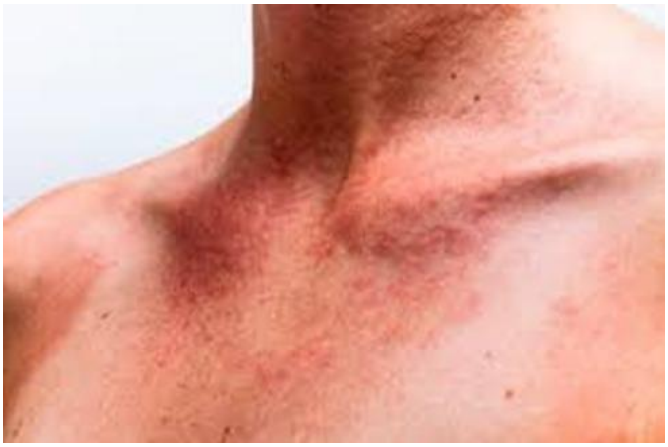
➢ **Adverse effects of Diclofenac:-**



Rashesh On Skin

Serious side effects include:
- heart attack
- stroke
- high blood pressure
- heart failure from body swelling (fluid retention)
- kidney problems including kidney failure
- bleeding and ulcers in the stomach and intestine
- low red blood cells (anemia)
- life-threatening skin reactions
- life-threatening allergic reactions
- liver problems including liver failure
- asthma attacks in people who have asthma

Other side effects include:
- stomach pain
- constipation
- diarrhea
- gas
- heartburn
- nausea
- vomiting
- dizziness

4. TIGASEROD

Tegaserod is gastric motility stimulant (IBS and constipation).

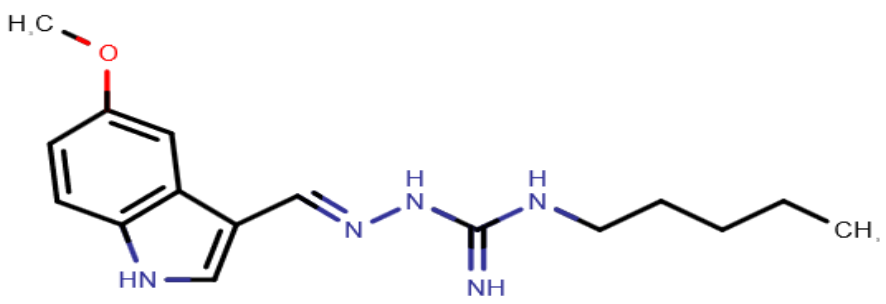
This drug manufacture by Novartis in 2002 and in India its banned in 2011.

The drug is banned globally due to 10fold increase in risk of heart attacks and stroke in 2007.

And the drug is withdrawn from market in 2011.

Molecular formula: $C_{16}H_{23}N_5O$

Molecular weight: 301.394g/mol.



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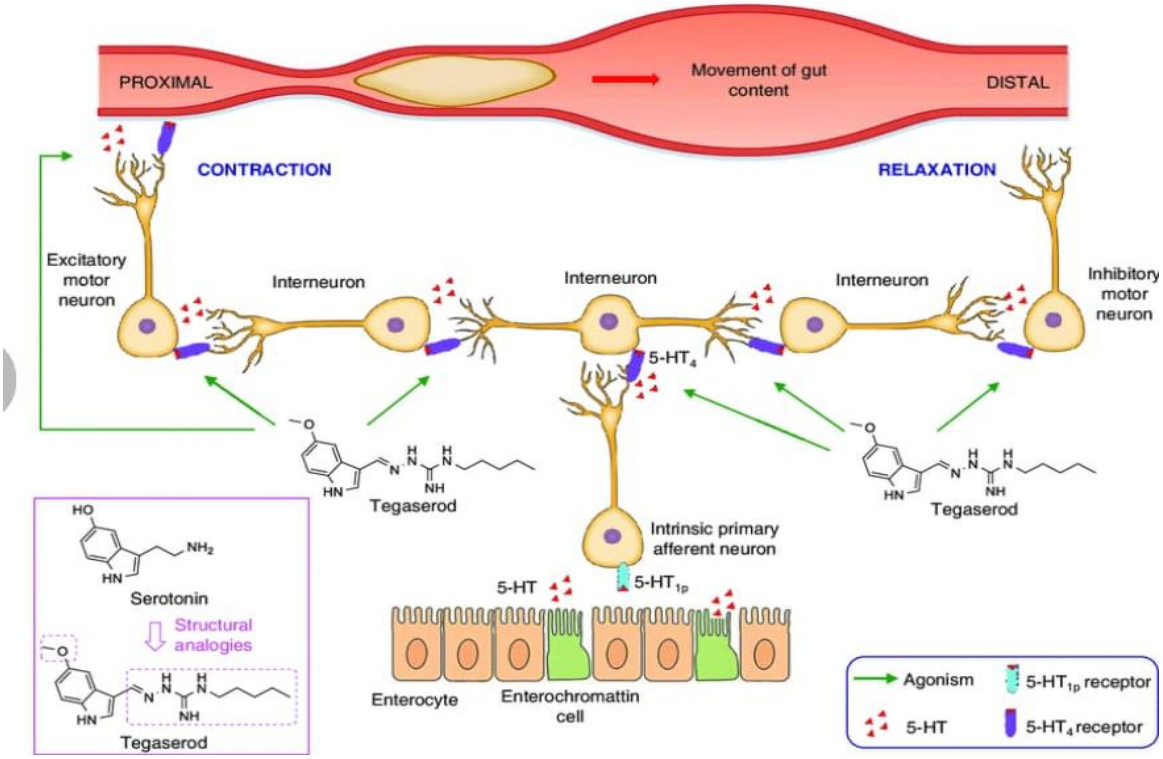
➢ **MECHANIS OF ACTION OF TEGASEROD. [13]**



Tegaserod is a medication that was primarily used to treat irritable bowel syndrome with constipation (IBS-C) in adults. It works by activating specific receptors in the gut, which helps to increase intestinal motility and relieve symptoms such as abdominal pain and bloating.

In India, Tegaserod has been banned by the Central Drugs Standard Control Organization (CDSCO), which is the regulatory body for pharmaceuticals in the country. The ban was implemented in 2007 due to concerns about the safety of the drug.

The decision to ban Tegaserod in India was based on reports of serious cardiovascular adverse events associated with its use. Some studies suggested an increased risk of heart attack, stroke, and other cardiovascular problems in patients taking Tegaserod, particularly in those with a history of cardiovascular disease.

As a result, the CDSCO decided to withdraw Tegaserod from the Indian market to protect patient safety. The ban remains in place as of now. **[14]**

5. Sibutramine

This drug is used for Antiobesity (anti anorexia).

Sibutramine is a norepinephrine, serotonin and dopamine reuptake inhibitor indicated to assist with weight loss in obesity.

Sibutramine is Introduced or prepared/ manufactured by the "Knoll Pharma followed by Abbott". This drug is manufactured in 1998 and banned in India in 2010 due to its risk of increase in heart attack, cardiac arrest and strokes led to withdraw from Indian market in 2010.

Molecular Formula:- $C_{17}H_{26}ClN$.

Molecular Weight:- 279.848 g/mol.

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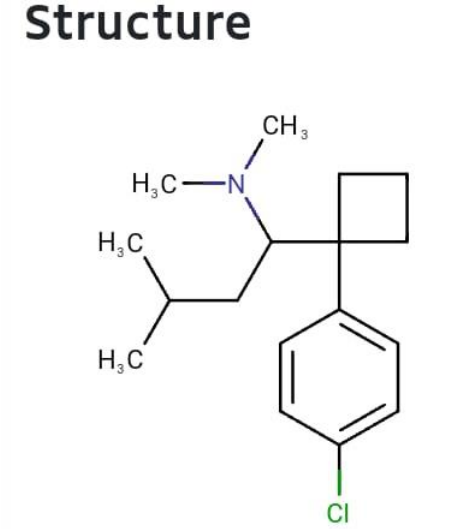
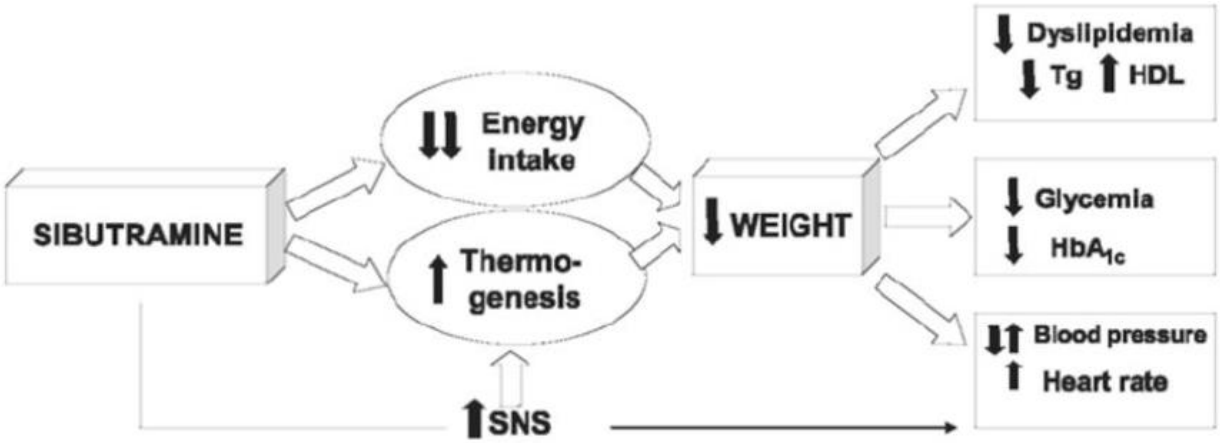
Structure



- **MOA of Sibutramine**



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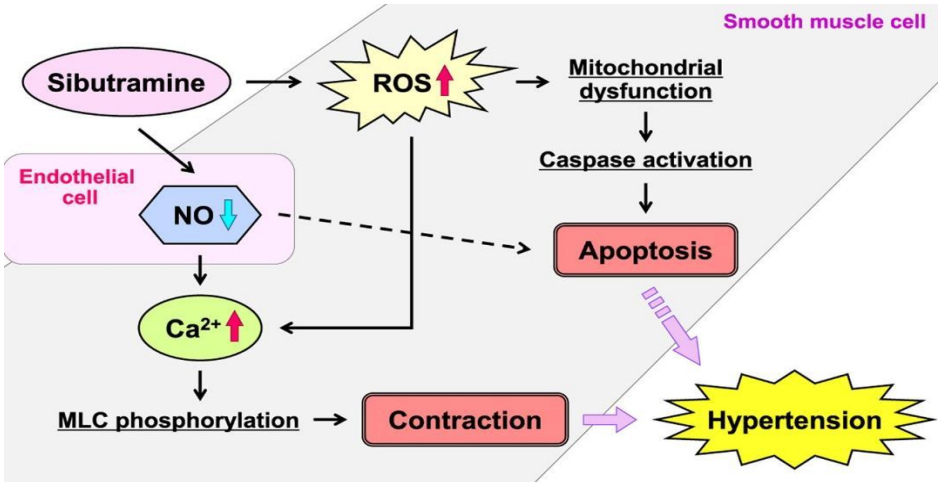

➢ **SIDE EFFECT OF SIBUTRAMINE:-**

- Very common (>1/10)

1. Constipation
2. Dry mouth
3. Insomnia

- Common (<1/10, >1/100)

1. Tachycardia
2. Palpitations
3. Increase in blood pressure
4. Vasodilatation
5. Nausea
6. Light-headedness
7. Headache
8. Sweating **[15]**

➢ **Here is the list of other drugs which are banned in India:-**

BANNED DRUGS USING IN INDIA

DRUGS	USE	REASON OF BAND	BRAND NAME
PHENYLPROPANOLAMINE	Cold and cough	Stroke	Vicks Action-500
ANALGIN	Pain-killer [Analgesic]	Bone marrow depression	Novalgin
CISAPRIDE	Acidity, constipation	Irregular heartbeat	Ciza, Syspride
DROPERIDOL	Anti-depressant	Irregular heartbeat	Droperol
FURAZOLIDONE	Antidiarrhoeal	Cancer	Furoxone, Lomofen
NIMESULIDE	Painkiller, fever	Liver failure	Nise, Nimulid
NITROFURAZONE	Antibacterial cream	Cancer	Furacin
PHENOLPHTHALEIN	Laxative	Cancer	Agarol
OXYPHENBUTAZONE	Non-steroidal anti-inflammatory drug	Bone marrow depression	Sioril
PIPERAZINE	Anti-worms	Nerve damage	Piperazine
QUINIODOCHLOR	Anti-diarrhoeal	Damage to sight	Enteroquinol

II. CONCLUSION

Here are the some drugs which are banned in India and other countries. We studied about the drug information and the mechanism of action of the drug on the human body and there therapeutic action. But after some time these drugs showing some major adverse effect (ADR) /Drug Related Problems (DPR's) to the patients. So the CDCSO and other authorities banned these drugs from India. Due to there harmful effect of the drug on human body they are banned from India.

III. REFERENCES

[1] World Health Organisation. WHO expert committee On drug dependence. Sixteenth report (Technical Report series. No 407). Geneva: World Health Organisation 1969.
[2] The importance of pharmacovigilance safety monitoring of medicinal products. World Health Organisation 2002;44
[3] https://www.slideshare.net/bdvfgbdhg/central-drug-standard-control organisation
[4] https://go.drugbank.com/drugs/DB04743
[5] Dastis SN, Rahier J, Lerut J, Geubel AP. Liver Transplantation for nonsteroidal anti-inflammatory Drug-induced liver failure: Nimesulide as the first Implicated compound. Eur J Gastroenterol Hepatol. 2007;19(11):919-22
[6] Walker SL, Kennedy F, Niamh N, McCormick PA. Nimesulide associated fulminant hepatic failure. Pharmacoepidemiol Drug Saf. 2008; 17(11):1108-12.
[7] Kulkarni S K. On the safety of Nimesulide, a preferential COX-2 inhibitor. Current Science. 83 (12):1442-3
[8] Goyal P K, Chandra J, Unnikrishnan G, Kumari S, Passah S M. double blind randomized comparative evaluation Of Nimesulide and paracetamol as antipyretics. Indian Pediatrics. 1998;35:519-22
[9] Gupta P, Sachdev H P Safety of oral use of Nimesulide In children: systematic review of randomized controlled Trials. Indian Pediatr. 2003;40(6):518-31
[10] Conforti A, Leone R, Moretti U, Mozzo F, Velo G. Adverse drug reactions related to the use of NSAIDs With a focus on Nimesulide: results of spontaneous Reporting from a Northern Italian area. Drug Saf 2001; 24: 1081-1090.
[11] https://go.drugbank.com/drugs/DB00637
[12] https://go.drugbank.com/drugs/DB00586
[13] https://www.researchgate.net/figure/Fig-3-Tegaserod-mechanism-of-action-on-5-HT-4-R-A-higher-resolution-colour_fig1_335809051
[14] https://go.drugbank.com/drugs/DB01079
[15] https://go.drugbank.com/drugs/DB01105
[16] https://imgur.com/qgSfA