Q.4 All of the following are long acting GnRH agonists EXCEPT:

Ans ✔ A. Cabergoline

✗ B. Buserelin

✗ C. Ganirelix

✗ D. Triptorelin

Question Type : **MCQ**
Question ID : **50886140904**
Option 1 ID : **508861163613**
Option 2 ID : **508861163612**
Option 3 ID : **508861163610**
Option 4 ID : **508861163611**
Status : **Not Answered**
Chosen Option : **--**

All of the following are long acting GnRH agonists EXCEPT

(a) Cabergoline

(b) Buserelin

(c) Ganirelix

(d) Triptorelin

Question to Claim

Options are wrong

DRUGS ALTERING ANTERIOR PITUITARY HORMONE SECRETION

Inhibit GH release
- Somatostatin
- Octreotide
- Lanreotide

Inhibit prolactin release
- Bromocriptine
- Cabergoline
- Apomorphine

Enhance prolactin release
- Chlorpromazine
- (other neuroleptics)
- Metoclopramide
- Reserpine

Inhibit gonadotropin (Gn) release

Superactive GnRH agonists

(Initially enhance Gn release)
- Nafarelin
- Goserelin
- Triptorelin
- Leuprolide

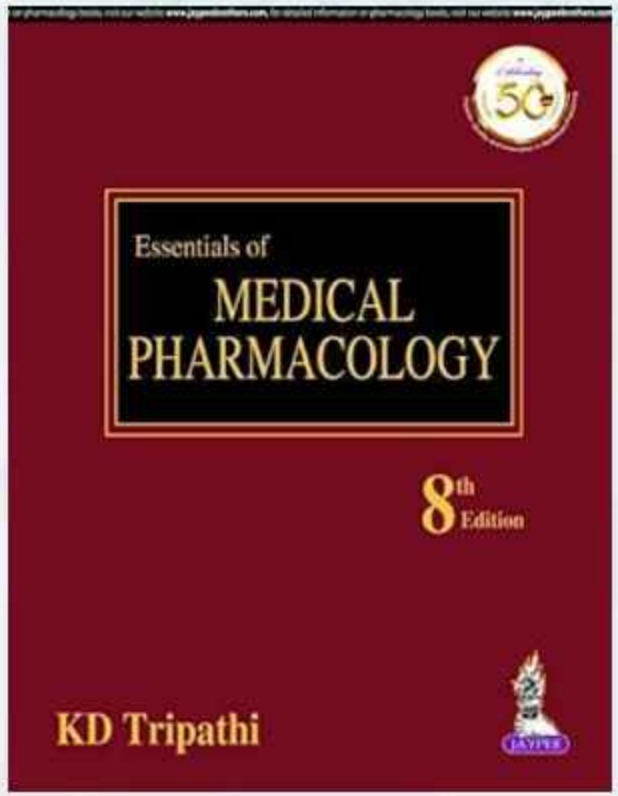
GnRH antagonists
- Ganirelix
- Cetrorelix

Reference: Essentials of medical pharmacology, KD Tripathi, 8th edition, Page no. 258

EXPLANATION

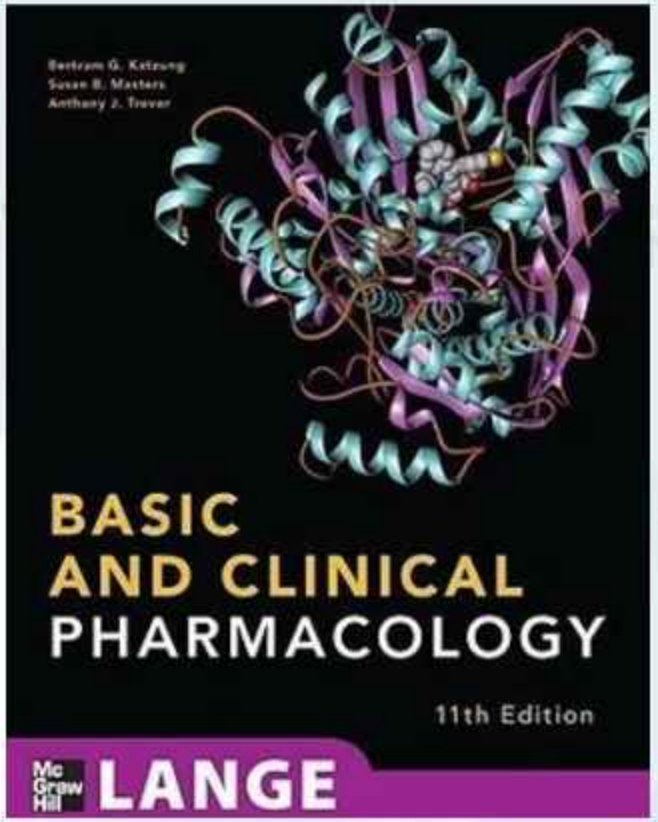
Cabergoline

It is a newer D2 agonist; more potent; more selective for pituitary lactotrope D2 receptors, and longer acting ($t_{½}$ > 60 hours) than bromocriptine. It needs to be given only twice weekly. Incidence of nausea and vomiting is also lower; some patients not tolerating or not responding to bromocriptine have been successfully treated with cabergoline. It is the first choice drug for treatment of hyper-prolactinaemia; serum prolactin levels fall to the normal range in 2–4 weeks, and many women conceive within one year. Cabergoline should be stopped when pregnancy occurs, though no teratogenic effect has been observed. Most micro- and some macro-prolactinomas show regression during therapy, and neurological symptoms (visual field defects, etc.) due to pressure on optic chiasma are relieved. Response is generally maintained only till the drug is given, with recurrence on stoppage. Some patients who achieve total regression of prolactinoma and normalization of prolactin levels can stop cabergoline without recurrence.



Reference: **Essentials of medical pharmacology, KD Tripathi, 8th edition, Page no. 261**

EXPLANATION



GnRH and its analogs (**nafarelin, buserelin,** etc) have become important in both stimulating and inhibiting ovarian function. They are discussed in Chapter 37.

Reference: Basic and Clinical pharmacology, Katzung, Page no. 733

- **Buserelin is GnRH analogue**
- **Triptorelin GnRH agonist**
- **Cabergolin is D2 receptor agonist**
- **Ganirelix is GnRH antagonist**

Q.25 Thixotropic behaviour is associated with:

Ans
- ✗ A. Increase in viscosity
- ✗ B. Solid and liquid behaviour
- ✗ C. Decrease in viscosity
- ✓ D. Sol-gel-sol transformation

Question Type : **MCQ**
Question ID : **50886134074**
Option 1 ID : **508861136290**
Option 2 ID : **508861136293**
Option 3 ID : **508861136291**
Option 4 ID : **508861136292**
Status : **Answered**
Chosen Option : **D**

Thixotropic behaviour is associated with

Question to Claim

(a) Increase in viscosity

(b) Solid and liquid behavior

(c) Decrease in viscosity

(d) Sol-gel-sol transformation

Note: The question seems incomplete, as options (a) and (c) describe parts of thixotropy.

THIXOTROPY

Non-newtonian systems such as plastic, pseudoplastic and dilatant systems at a given temperature show time dependent changes in the viscosity at varying shearing stresses. This behaviour is known as thixotropy and may be explained in the following manner :

1. Thixotropy in Plastic and Pseudoplastic Systems

In plastic and pseudoplastic systems, the viscosity gradually decreases on increases the shearing stress, at any given temperature. On removing the shearing stress, the viscosity is regained but not immediately but after some time lag. The term thixotropy is given to this phenomenon. It means "to change by touch" and may be described as a reversible isothermal transformation from gel to sol.

$$\text{Gel} \xrightarrow{\text{Application of shear stress}} \text{Sol} \xrightarrow{\text{Removal of shear stress}} \text{Gel}$$

If a rheogram is obtained for such a system by plotting the rate of shear at various shearing stresses, a hysteresis loop as shown in Fig. 4.12 is obtained. As the shearing stress is increased an

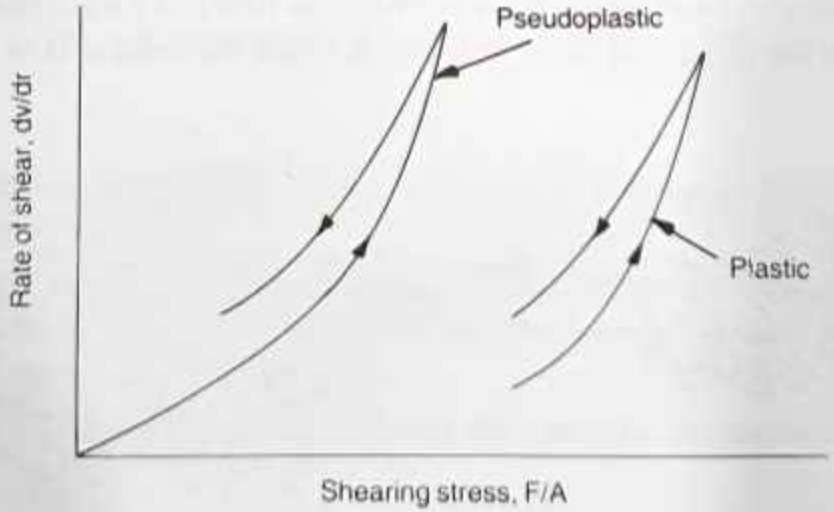
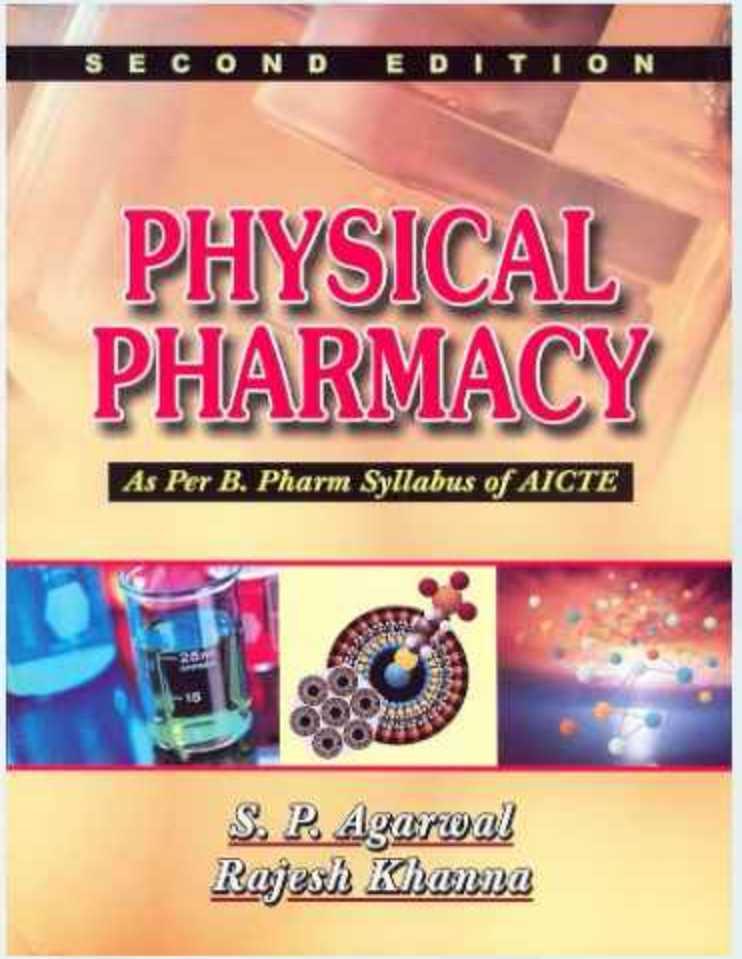
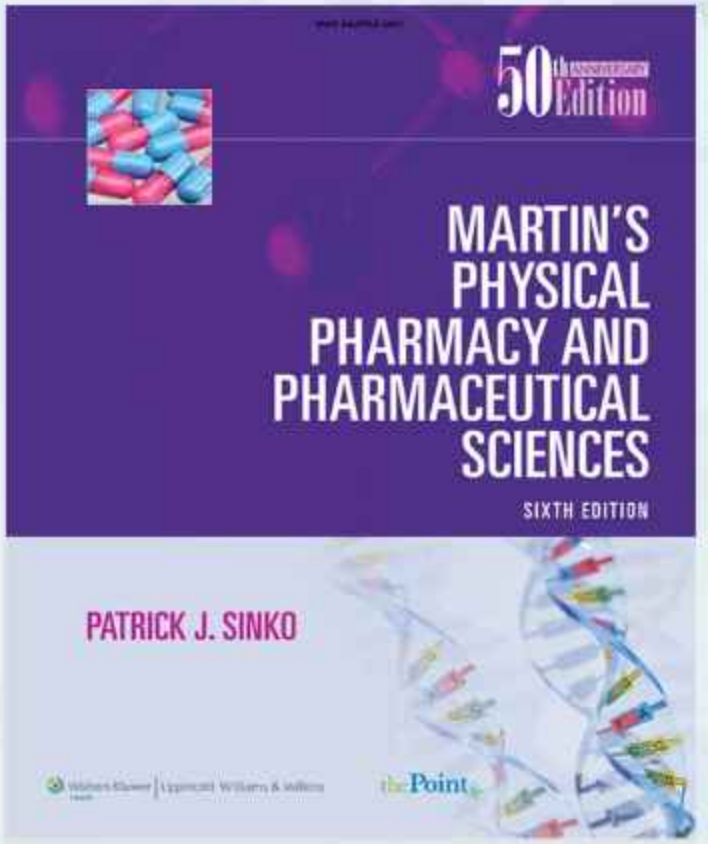


Fig. 4.12. Thixotropy in plastic and pseudoplastic systems.

Reference book – Physical pharmacy S.P. Agarwal and Rajesh Khanna 2nd edition Page no - 116



Thixotropic systems usually contain asymmetric particles that, through numerous points of contact, set up a loose three-dimensional network throughout the sample. At rest, this structure confers some degree of rigidity on the system, and it resembles a gel. As shear is applied and flow starts, this structure begins to break down as points of contact are disrupted and particles become aligned. The material undergoes a gel-to-sol transformation and exhibits shear thinning. On removal of stress, the structure starts to reform. This process is not instantaneous; rather, it is a progressive restoration of consistency as asymmetric particles come into contact with



Thixotropic behavior means viscosity decreases when shear is applied and increases again when shear is removed, forming a reversible sol-gel-sol change.

Reference book – Martin's physical pharmacy and Pharmaceutical sciences 6th edition
Page no- 474

Figure 3-7 ▯ Thixotropic behaviour exhibited by plastic and pseudoplastic systems.

The phenomenon of thixotropy is explained in terms of particle-particle interactions (Figure 3-8). At rest, particles in the dispersion impart rigidity on the system through multipoint contacts. The system behaves like a gel. As shear is applied, the contacts begin to break down, the particles are aligned and the flow starts. The material undergoes a gel-to-sol transformation inducing the system to exhibit shear thinning. Upon the removal of stress, the system starts regaining its original state.

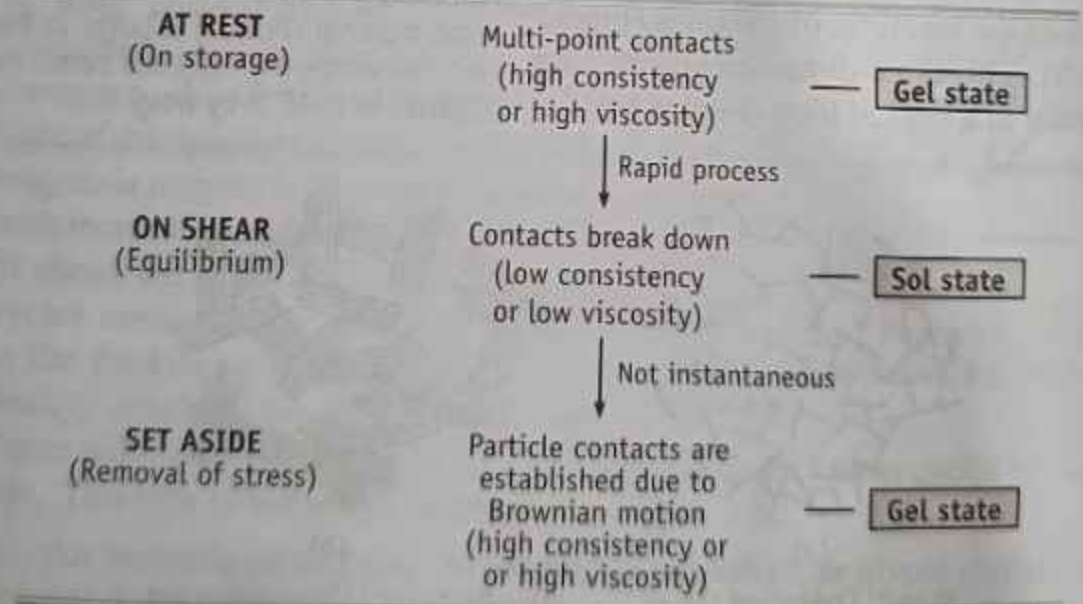
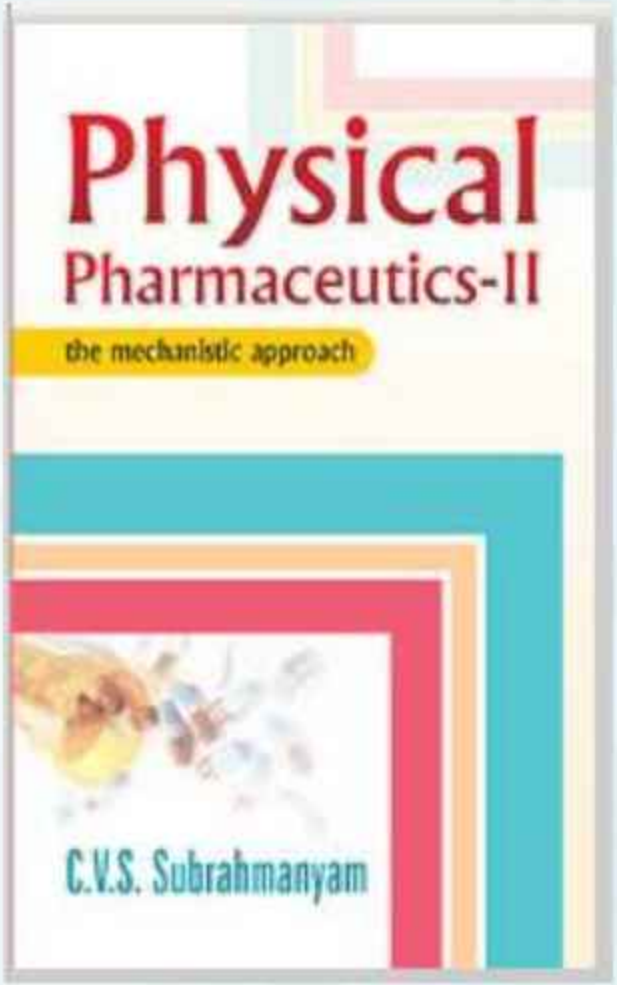


Figure 3-8 ▯ Particle-particle interactions in a thixotropic material. Gel-sol-gel transformations.

Reference book – Physical pharmaceutics – II CVS Subrahmanyam 2nd edition, page no - 103



doi:10.1351/goldbook.W06691

work softening

Also contains definitions of: shear breakdown, thixotropy

The application of a finite shear to a system after a long rest may result in a decrease of the viscosity or the consistency. If the decrease persists when the shear is discontinued, this behaviour is called work softening (or shear breakdown), whereas if the original viscosity or consistency is recovered this behaviour is called thixotropy.

Source:
PAC, 1979, *51*, 1213 *(Manual of symbols and terminology for physicochemical quantities and units. Appendix II: Definitions, terminology and symbols in colloid and surface chemistry. Part 1.13. Selected definitions, terminology and symbols for rheological properties)* on page 1217

Q.23 Glycogenic amino acids entered in TCA cycle except:

Ans
- ✗ A. Glutamate
- ✗ B. Alanine
- ✗ C. Aspartate
- ✓ D. Glycine

Question Type : **MCQ**
Question ID : **50886140344**
Option 1 ID : **508861161370**
Option 2 ID : **508861161372**
Option 3 ID : **508861161371**
Option 4 ID : **508861161373**
Status : **Not Answered**
Chosen Option : **--**

Glycogenic amino acids entered in TCA cycle except

(a) Glutamate

(b) Alanine

(c) Aspartate

(d) Glycine

Question to Claim

Both (b) and (d) are Correct Option

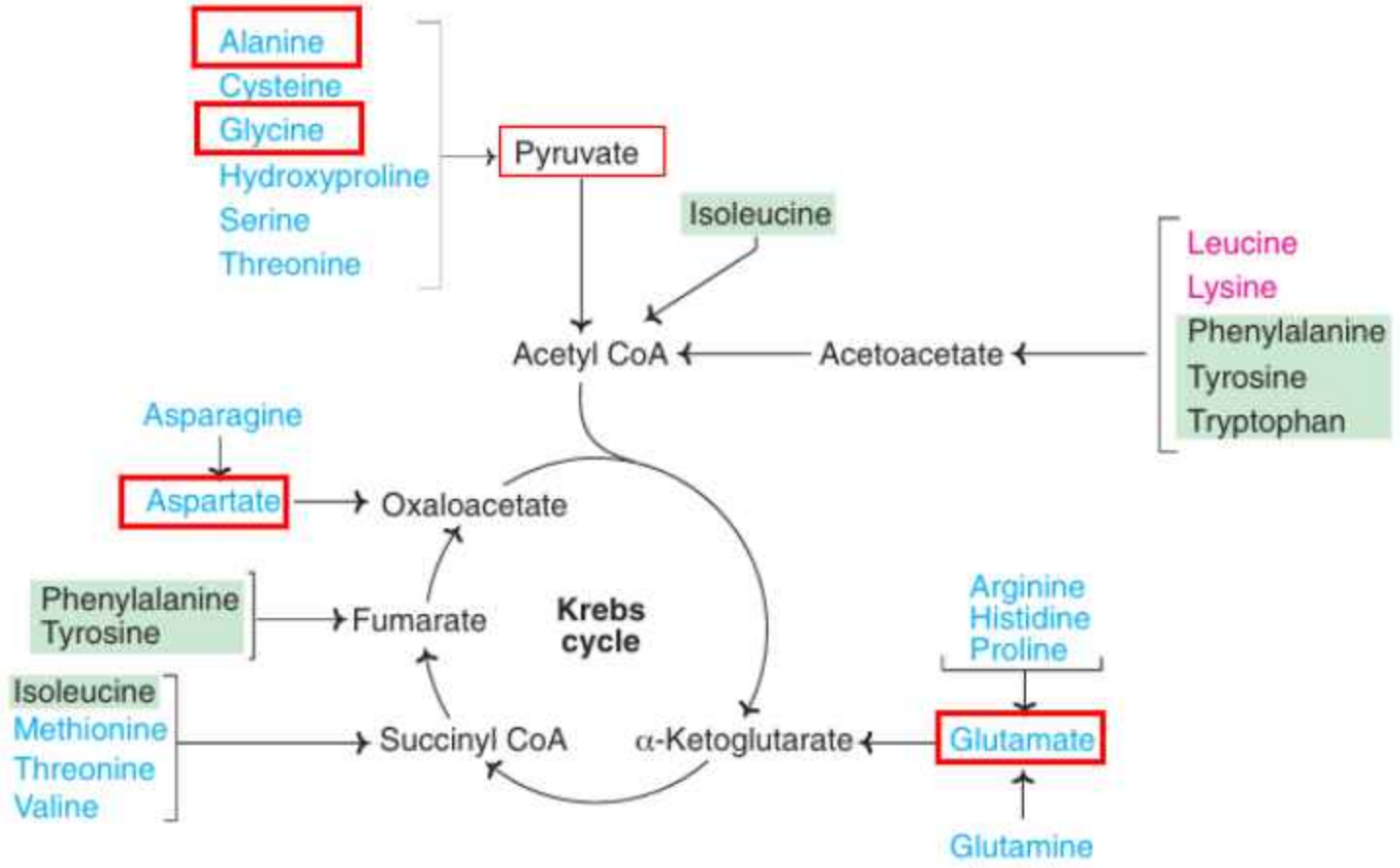


Fig. 15.43 : *Summary of the products formed from carbon skeleton of amino acids (colour indication, Blue–glucogenic; Green shade–glucogenic and ketogenic; Red–ketogenic).*

Table 15.4 Classification of amino acids based on the fate of carbon skeleton

Glycogenic (glucogenic)	*Glycogenic and ketogenic*	*Ketogenic*
Alanine	Phenylalanine*	Leucine*
Arginine*	Isoleucine*	Lysine*
Aspartate	Tyrosine	
Cysteine	Tryptophan*	
Glutamine		
Glutamate		
Glycine		
Histidine*		
Hydroxyproline		
Methionine*		
Proline		
Serine		
Threonine*		
Valine*		

* *Essential amino acids; (Helpful tips to recall—ketogenic amino acids start with letter 'L'; PITT for glyco- and ketogenic amino acids; rest of the 20 amino acids are only glycogenic).*

Reference: Biochemistry, U. Satyanarayana and U. Chakrapani, 4th edition, Page no. 373

According to the reference book, both alanine and glycine are glycogenic amino acids and do not directly enter the TCA cycle.

Q.12 Which nasal decongestant is a selective α-2 adrenergic receptor agonist:

Ans ✗ A. Loratadine

✓ B. Oxymetazoline

✗ C. Cetirizine

✗ D. Montelukast

Question Type : **MCQ**
Question ID : **50886134225**
Option 1 ID : **508861136895**
Option 2 ID : **508861136896**
Option 3 ID : **508861136894**
Option 4 ID : **508861136897**
Status : **Not Answered**
Chosen Option : **--**

Which nasal decongestant is a selective α-2 adrenergic receptor agonist

(a) Loratadine

(b) Oxymetazoline

(c) Cetirizine

(d) Montelukast

Question to Claim

Options are wrong

EXPLANATION

NASAL DECONGESTANTS

These are α agonists which on topical application as dilute solution (0.05–0.1%) produce vasoconstriction in the nasal mucosa which primarily expresses α receptors. The imidazoline compounds—naphazoline, xylometazoline and oxymetazoline are relatively selective α_2 agonist (like clonidine). They have a longer duration of action (12 hours) than ephedrine. After-congestion in nasal mucosa is claimed to be less than that with ephedrine or phenylephrine. They may cause initial stinging sensation (specially naphazoline). Regular use of these agents for long periods should be avoided because mucosal ciliary

Reference: Essentials of medical pharmacology, KD Tripathi, 8th edition, Page no. 149

EXPLANATION

Montelukast and Zafirlukast Both have similar actions and clinical utility. They competitively antagonize *cys*LT$_1$ receptor (*see* p. 205) mediated bronchoconstriction, airway mucus secretion, increased vascular permeability and recruitment of eosinophils. Bronchodilatation, reduced sputum eosinophil count, suppression of bronchial inflammation, mucus and hyperreactivity are noted in asthma patients. Parameters of lung function show improvement to variable degree. Episodes of asthma exacerbations are reduced. Some studies have found that certain patients are 'responders' while others are 'nonresponders' to anti-LT therapy. This may reflect differing extent of involvement of LTs as asthma mediators.

Reference: Essentials of medical pharmacology, KD Tripathi, 8th edition, Page no. 248

EXPLANATION

IV. *SECOND GENERATION ANTIHISTAMINICS*		
Fexofenadine	120–180 mg oral	ALLEGRA, ALTIVA, FEXO 120, 180 mg tab
Loratadine	10 mg oral	LORFAST, LORIDIN, LORMEG, 10 mg tab, 1 mg/ml susp.
Desloratadine	5 mg oral	DESLOR, LORDAY, NEOLORIDIN 5 mg tab
Cetirizine	10 mg oral	ALERID, CETZINE, ZIRTIN, SIZON 10 mg tab, 5 mg/5 ml syr.

Reference: Essentials of medical pharmacology, KD Tripathi, 8th edition, Page no. 179

- **Oxymetazoline** nasal decongestant is a selective α-2 adrenergic receptor agonist
- Loratadine and Cetirizine is second generation Antihistamine
- Montelukast is LT_1 receptor antagonist

So, answer will be **Oxymetazoline**

Q.11 Which one of the following anticonvulsant drugs act on a selective molecular target:

Ans
- ✗ A. Gabapentin
- ✗ B. Pregabalin
- ✗ C. Lamotrigine
- ✓ D. Tiagabine

Question Type : **MCQ**
Question ID : **50886140239**
Option 1 ID : **508861160952**
Option 2 ID : **508861160953**
Option 3 ID : **508861160951**
Option 4 ID : **508861160950**
Status : **Not Answered**
Chosen Option : **--**

Which one of the following anticonvulsant drugs act on a selective molecular target

(a) Gabapentin

(b) Pregabalin

(c) Lamotrigine

(d) Tiagabine

Question to Claim

Correct option NOT available

Tiagabine This newer anticonvulsant potentiates GABA mediated neuronal inhibition by blocking GABA transporter GAT-1 which removes synaptically released GABA into neurones and glial cells (*see* Fig. 30.1). Kindled seizures are suppressed with less marked effect on maximal electroshock. Currently it is approved only for add-on therapy of partial seizures with or without secondary generalization, when not adequately controlled by standard antiepileptic drugs alone. Side effects are mild sedation, nervousness, asthenia, amnesia, dermatitis and abdominal pain.

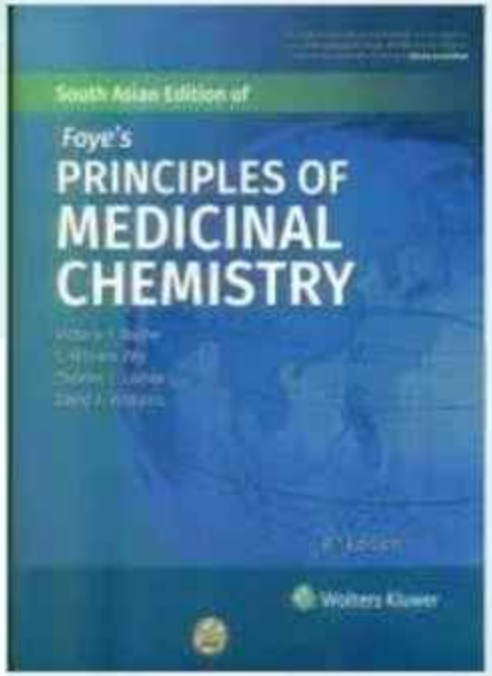
Tiagabine is well absorbed, partly metabolized and excreted mainly in faeces. The t½ is 6 hours.

Dose: 4–16 mg TDS

Reference: Essentials of medical pharmacology, KD Tripathi, 8th edition, Page no. 448

Tiagabine, by selectively inhibiting GAT-1, which may be the major GABA neuronal reuptake transporter, is an approved agent for the treatment of partial seizures (see Chapter 20). Clinical trials are underway for its use in the treatment of anxiety, neuropathic pain, and insomnia (24). Two GABA analogues that have been shown to interact with GAT-1 include gabapentin and pregabalin. The concentrations required to inhibit GAT, however, are very high, and a GABAergic mechanism of action most likely does not explain their anticonvulsant activity (25). Despite their close structural similarity to GABA, inhibition of a voltage-gated calcium channel containing the $\alpha_2\delta_1$ subunit is believed to be responsible for their pharmacological actions.

Seizure disorders can be devastating to a patient's quality of life. Restrictions placed on patients with epilepsy include revocation of driver's licenses, potential physical limitations, work absenteeism, and various emotional and mental issues related to the disease and to the side effects from many of the medications these patients require. Because of the nature of the pathophysiology of seizures (i.e., abnormal neuron firing involving ion channels and an imbalance between excitatory and inhibitory synaptic function), medicinal chemistry plays a vital role in the understanding of this disease and, particularly, in its treatment. Molecular agents used to treat seizures exert varying effects on neuronal function through their structure–activity relationships and chemical interactions with ion channels (carbamazepine, phenytoin, ethosuximide, and zonisamide) and their similarities to naturally occurring neurotransmitters, such as γ-aminobutyric acid (GABA; benzodiazepines, barbiturates, topiramate, gabapentin, and tiagabine).



Reference: Foye's Principles of Medicinal Chemistry (Lemke, Foye's Principles of Medicinal Chemistry) Pg. no. -454, 522

Fact Check Questions

Which nasal decongestant is a selective α-2 adrenergic receptor agonist

(a) Loratadine

(b) Oxymetazoline

(c) Cetirizine

(d) Montelukast

Question to Claim

Options are wrong

EXPLANATION

NASAL DECONGESTANTS

These are α agonists which on topical application as dilute solution (0.05–0.1%) produce vasoconstriction in the nasal mucosa which primarily expresses α receptors. The imidazoline compounds—naphazoline, xylometazoline and oxymetazoline are relatively selective α_2 agonist (like clonidine). They have a longer duration of action (12 hours) than ephedrine. After-congestion in nasal mucosa is claimed to be less than that with ephedrine or phenylephrine. They may cause initial stinging sensation (specially naphazoline). Regular use of these agents for long periods should be avoided because mucosal ciliary

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EXPLANATION

Montelukast and Zafirlukast Both have similar actions and clinical utility. They competitively antagonize *cys*LT$_1$ receptor (*see* p. 205) mediated bronchoconstriction, airway mucus secretion, increased vascular permeability and recruitment of eosinophils. Bronchodilatation, reduced sputum eosinophil count, suppression of bronchial inflammation, mucus and hyperreactivity are noted in asthma patients. Parameters of lung function show improvement to variable degree. Episodes of asthma exacerbations are reduced. Some studies have found that certain patients are 'responders' while others are 'nonresponders' to anti-LT therapy. This may reflect differing extent of involvement of LTs as asthma mediators.

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EXPLANATION

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So, answer will be **Oxymetazoline**

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Ans
- ✗ A. Gabapentin
- ✗ B. Pregabalin
- ✗ C. Lamotrigine
- ✓ D. Tiagabine

Question Type : **MCQ**
Question ID : **50886140239**
Option 1 ID : **508861160952**
Option 2 ID : **508861160953**
Option 3 ID : **508861160951**
Option 4 ID : **508861160950**
Status : **Not Answered**
Chosen Option : **--**

Which one of the following anticonvulsant drugs act on a selective molecular target

(a) Gabapentin

(b) Pregabalin

(c) Lamotrigine

(d) Tiagabine

Question to Claim

Correct option NOT available

Tiagabine This newer anticonvulsant potentiates GABA mediated neuronal inhibition by blocking GABA transporter GAT-1 which removes synaptically released GABA into neurones and glial cells (*see* Fig. 30.1). Kindled seizures are suppressed with less marked effect on maximal electroshock. Currently it is approved only for add-on therapy of partial seizures with or without secondary generalization, when not adequately controlled by standard antiepileptic drugs alone. Side effects are mild sedation, nervousness, asthenia, amnesia, dermatitis and abdominal pain.

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Dose: 4–16 mg TDS

Reference: Essentials of medical pharmacology, KD Tripathi, 8th edition, Page no. 448

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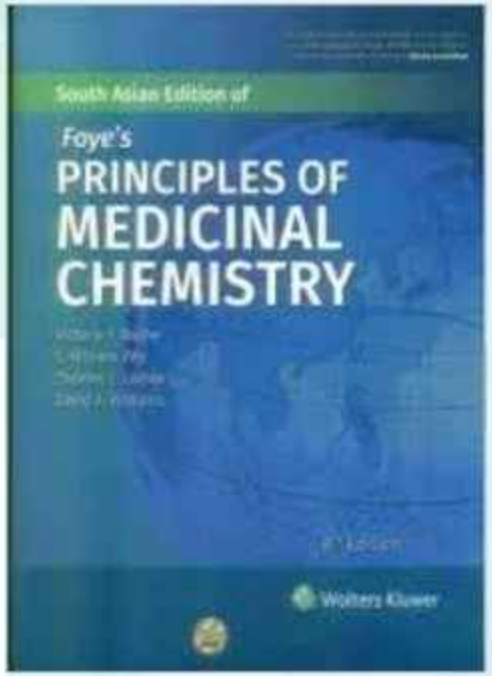


Reference: Foye's Principles of Medicinal Chemistry (Lemke, Foye's Principles of Medicinal Chemistry) Pg. no. -454, 522

Q.17 Manufacturing specifications for tooling have been standardized by:

Ans
- ✗ A. Physican Desk reference of Industry
- ✗ B. National Drug Code
- ✓ C. Academy of Pharmaceutical Sciences
- ✗ D. Indian Pharmacopeial Commission

Question Type : **MCQ**
Question ID : **50886140501**
Option 1 ID : **508861161999**
Option 2 ID : **508861161998**
Option 3 ID : **508861162001**
Option 4 ID : **508861162000**
Status : **Answered**
Chosen Option : **D**

Manufacturing specifications for tooling have been standardized by

(a) Physican Desk reference of Industry

(b) National Drug Code

(c) Academy of Pharmaceutical Sciences

(d) Indian Pharmacopeial Commission

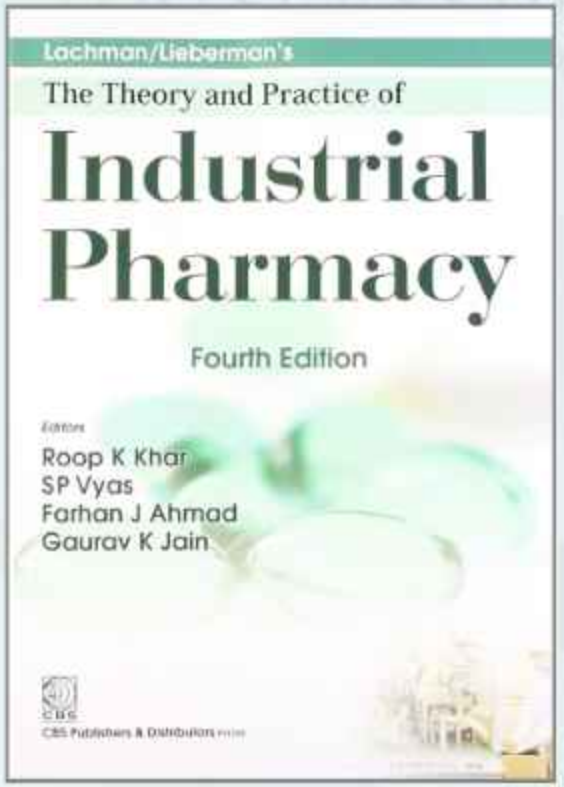
EXPLANATION

...e expected compression forces involved, ...d whether the materials to be processed are ...asive or corrosive.

The size, shape, and contour of a tablet is ...most unlimited within the given limits of the ...ecified die size. A survey of the PDR Product ...ntification section reveals numerous varia... ...ns on tablet size and shape. In addition, ...ling can be made with certain other ...rmation to aid in producing a visibly ...que tablet product. Company names or ...bols, trade names, dosage strength, or ...onal Drug Code (NDC) numbers can be ...or engraved into a punch face, or the ...ches may be scored, to produce uniquely ...ssed or engraved tablets. Even though ...ng design would ...

must fit on the tablet surface. Many considerations, at close tolerances, must be incorporated in tooling design to produce tablets that are uniform and aesthatic. Manufacturing specifications for tooling have been standardized by the Industrial Pharmaceutical Technology Section of the Academy of Pharmaceutical Sciences in its Standard Specifications of Tabletting Tools.

Because of its hard steel structure, tablet tooling may appear to be indestructible. During normal use, however, the punches and dies become worn, and the cyclic application of stress can cause the steel to fatigue and break. Improper storage and handling can readily result in damage that necessitates



Reference: Lachman Lieberman's The Theory and Practice of Industrial Pharmacy, Roop K Khar, 4th edition, Page no. 477

Q.19 Which instrument is used for measurement of structural breakdown in thixotropic material:

Ans
- ✗ A. Viscometer
- ✓ B. Planimeter
- ✗ C. Orifice meter
- ✗ D. Rotameter

Question Type : **MCQ**
Question ID : **50886140506**
Option 1 ID : **508861162018**
Option 2 ID : **508861162021**
Option 3 ID : **508861162019**
Option 4 ID : **508861162020**
Status : **Answered**
Chosen Option : **A**

Which instrument is used for measurement of structural breakdown in thixotropic material

(a) Viscometer

(b) Planimeter

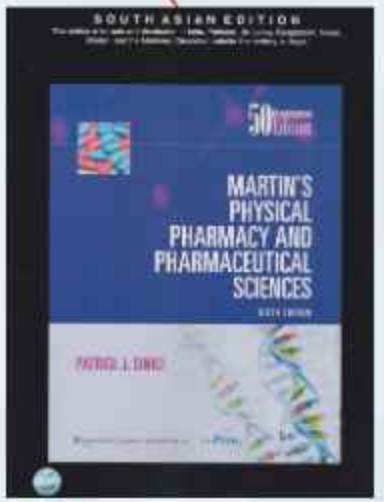
(c) Orifice meter

(d) Rotameter

EXPLANATION

Measurement of Thixotropy

A quantitative measurement of thixotropy can be attempted in several ways. The most apparent characteristic of a thixotropic system is the hysteresis loop formed by the upcurves and downcurves of the rheogram. This *area of hysteresis* has been proposed as a measure of thixotropic breakdown; it can be obtained readily by means of a planimeter or other suitable technique.



Reference: Martin's Physical Pharmacy and Pharmaceutical Science, Patrick J. Sinko, 6th edition, Page no. 44

Q.8 Triple point of water occurs at which temperature and pressure:

Ans
- ✗ A. 0.098°C and 4.58 mmHg
- ✗ B. 0.0098°F and 4.58 mmHg
- ✗ C. 0.098°F and 4.58 mmHg
- ✓ D. 0.0098°C and 4.58 mmHg

Question Type : **MCQ**
Question ID : **50886140542**
Option 1 ID : **508861162163**
Option 2 ID : **508861162165**
Option 3 ID : **508861162164**
Option 4 ID : **508861162162**
Status : **Answered**
Chosen Option : **B**

Triple point of water occurs at which temperature and pressure

(a) 0.098°C and 4.58 mmHg

(b) 0.0098°F and 4.58 mmHg

(c) 0.098°F and 4.58 mmHg

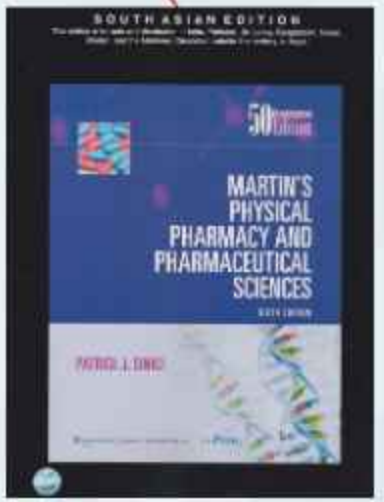
(d) 0.0098°C and 4.58 mmHg

EXPLANATION

Systems Containing One Component

We have already considered a system containing one component, namely, that for water, which is illustrated in **Figure 2–22** (not drawn to scale). The curve OA in the *P–T* (pressure–temperature) diagram in **Figure 2–22** is known as the *vapor pressure curve*. Its upper limit is at the critical temperature, 374°C for water, and its lower end terminates at 0.0098°C, called the *triple point*. Along the vapor pressure curve, vapor and liquid coexist in equilibrium. This curve is analogous to the curve for water seen in **Figure 2–5**. Curve OC is the sublimation curve, and here vapor and solid exist together in equilibrium. Curve OB is the melting point curve, at which liquid and solid are in equilibrium. The negative slope of OB shows that the freezing point of water decreases with increasing external pressure, as we already found in *Example 2–8*.

As already noted, the triple point for air-free water is 0.0098°C, whereas the freezing point (i.e., the point at which liquid water saturated with air is in equilibrium with ice at a total pressure of 1 atm) is 0°C. In increasing the pressure from 4.58 mm to 1 atm, we lower the freezing point by about 0.0075 deg (*Example 2–8*). The freezing point is then lowered an additional 0.0023 deg by the presence of dissolved air in water at 1 atm. Hence, the normal freezing point of water is 0.0075 deg + 0.0023 deg = 0.0098 deg below the triple point. In summary, the temperature at which a solid melts depends (weakly) on the pressure. If the pressure is that of the liquid and solid in equilibrium with the vapor, the temperature is known as the triple point; however, if the pressure is 1 atm, the temperature is the normal freezing point.



Reference: Martin's Physical Pharmacy and Pharmaceutical Science, Patrick J. Sinko, 6th edition, Page no. 44

Q.21 Amongst the following liquids, which liquid has a highest surface tension against water at 20°C:

Ans
- ✗ A. Carbon Tetrachloride
- ✓ B. Mercury
- ✗ C. Oleic acid
- ✗ D. Octane

Question Type : **MCQ**
Question ID : **50886140510**
Option 1 ID : **508861162035**
Option 2 ID : **508861162036**
Option 3 ID : **508861162037**
Option 4 ID : **508861162034**
Status : **Answered**
Chosen Option : **C**

Amongst the following liquids, which liquid has a highest surface tension against water at 20°C

(a) Carbon Tetrachloride

(b) Mercury

(c) Oleic acid

(d) Octane

SURFACE AND INTERFACIAL TENSION

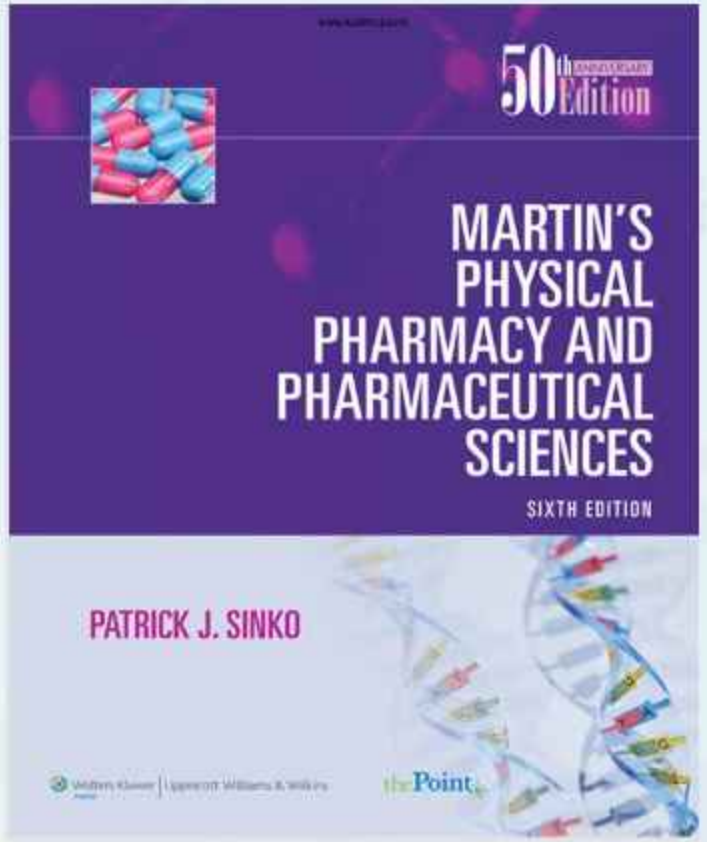
SURFACE TENSION	INTERFACIAL TENSION
Surface tension is the **tension of the surface film** of a liquid caused by the **attraction of the particles** in the surface layer by the **bulk of the liquid**, which tends to minimise surface area	Interfacial tension is the **force per unit length existing** at the interface between **two immiscible liquids.**
Force per unit length acting at surface at right angle	Force per unit length acting at interface at right angle
Surface is boundary between two phases, where one of the **two phase is gas or vapour**	Interface is boundary between **two phase(Liquid or Solid)**
Indicate strength of cohesive force	Indicate strength of adhesive force
Unit :- **N/m or dyne /cm**	Unit :- **N/m or dyne /cm**
	

TABLE 15–2

SURFACE TENSION AND INTERFACIAL TENSION (AGAINST WATER) AT 20°C*

Substance	Surface Tension (dynes/cm)	Substance	Interfacial Tension (dynes/cm)
Water	72.8	Mercury	375
Glycerin	63.4	*n*-Hexane	51.1
Oleic acid	32.5	Benzene	35.0
Benzene	28.9	Chloroform	32.8
Chloroform	27.1	Oleic acid	15.6
Carbon tetrachloride	26.7	*n*-Octyl alcohol	8.52
Caster oil	39.0	Caprylic acid	8.22
Olive oil	35.8	Olive oil	22.9
Cottonseed oil	35.4	Ethyl ether	10.7
Liquid petrolatum	33.1		

*From P. Becher, *Emulsions: Theory and Practice*, 2nd Ed., Reinhold, New York, 1962, and other sources.

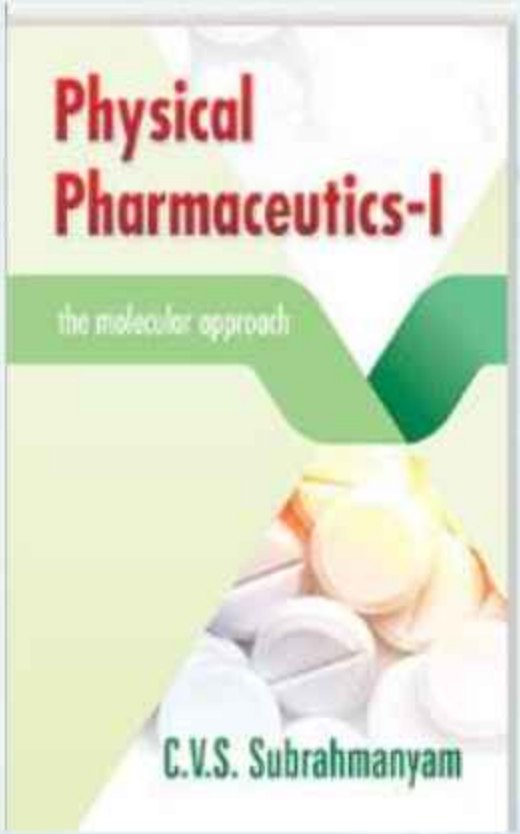


Reference book – Martin's physical pharmacy and Pharmaceutical sciences 6th edition
Page no- 357

TABLE 13-2

Surface Tensions of Liquids

Liquid	*Surface tension, mN/m (= dy/cm)*	*Liquid*	*Surface tension, mN/m (= dy/cm)*
Water	71.60	Mercury	480
Glycerin	66.00	Molten sodium chloride	22.89 (30 °C)
Ethanol	21.62		
Paraffin	30.0		



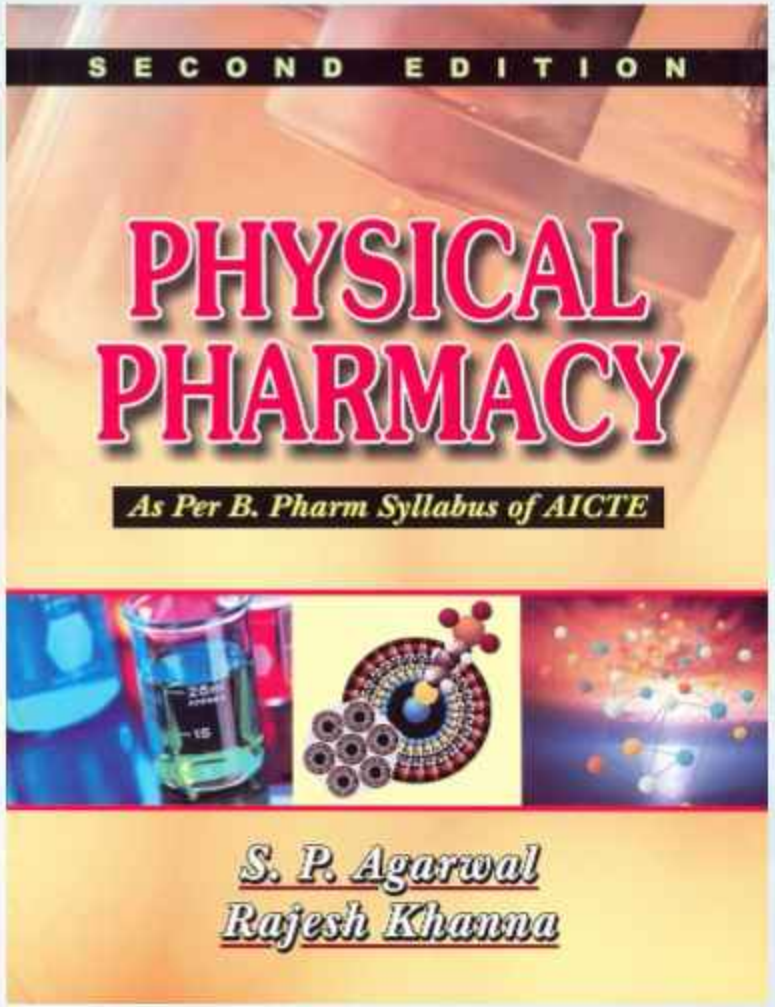
Reference book – Physical pharmaceutics – I, CVS Subrahmanyam 2nd edition, page no - 337

Table 3.1. Surface tension of some liquids at 20°C

Substance	*Surface Tension in dynes/cm*
Mercury	476
Olive oil	35.8
Water	72.8
Glycerin	63.4
Benzene	28.9
Heptane	19.7
Chloroform	27.1

Table 3.2. Interfacial tension against Water at 20°C

Substance	*Interfacial Tension in dynes/cm*
Heptane	51.2
Olive oil	22.9
Benzene	35.0
Mercury	428.0
Chloroform	32.8



Reference book – Physical pharmacy, S.P. Agarwal and Rajesh Khanna 2nd edition Page no - 54

Q.2 What is the fasting physiological pH value in the jejunum:

Ans
- ✗ A. 4.8 ± 0.4
- ✓ B. 6.8 ± 0.4
- ✗ C. 3.2 ± 0.4
- ✗ D. 8.6 ± 0.4

Question Type : **MCQ**
Question ID : **50886140493**
Option 1 ID : **508861161967**
Option 2 ID : **508861161968**
Option 3 ID : **508861161966**
Option 4 ID : **508861161969**
Status : **Answered**
Chosen Option : **A**

What is the fasting physiological pH value in the jejunum

(a) 4.8 ± 0.4

(b) 6.8 ± 0.4

(c) 3.2 ± 0.4

(d) 8.6 ± 0.4

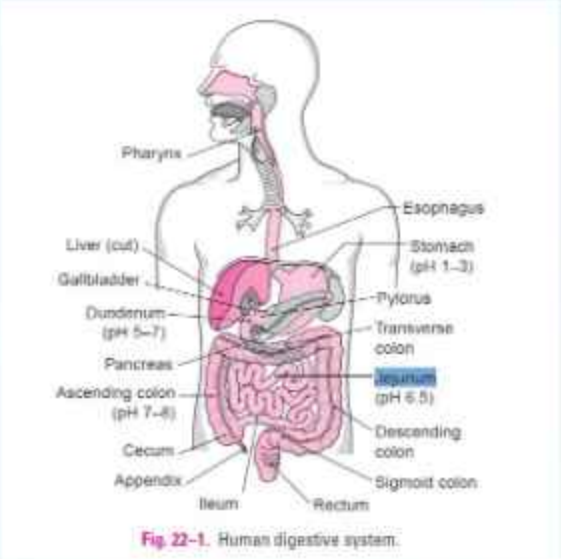
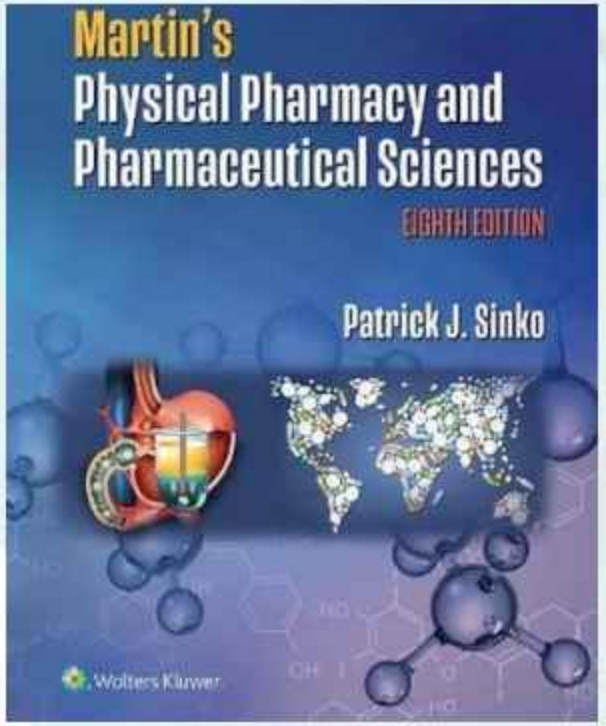


Fig. 22–1. Human digestive system.



tion behavior and pharmacokinetics of drugs. Changes also occur in the characteristics of the paracellular spaces throughout the intestine. Intestinal pH is relatively constant and ranges from about pH 5 in the duodenal bathing region of the upper small intestine to pH 6.5 to 7.2 in other areas of the intestine and colon.

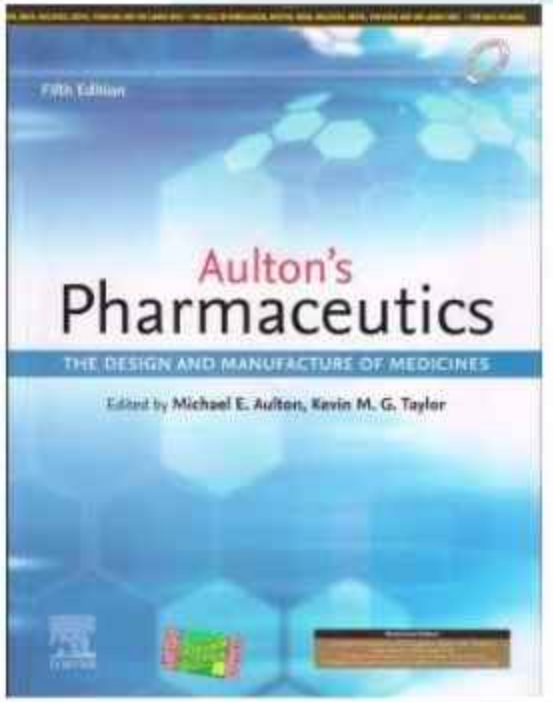
Reference: Martin's Physical Pharmacy and Pharmaceutical Science, Patrick J. Sinko, 6th edition, Page no.564

IV lasts up to 7 min and is a transition between the forceful contractions of phase III and the gentle mixing contractions of phase I. The pH of fasting healthy adults is approximately 2 to 3, whereas fed-state pH is considerably higher, in the range of pH 5 to 6.

Table 19.1 pH in the small intestine in healthy humans in the fasted and fed states

Location	Fasted state pH	Fed state pH
Mid-distal duodenum	4.9 6.1 6.3 6.4	5.2 5.4 5.1
Jejunum	4.4–6.5 6.6	5.2–6.0 6.2
Ileum	6.5 6.8–8.0 7.4	6.8–7.8 6.8–8.0 7.5

Data from Gray & Dressman (1996)



Reference: Aulton's Pharmaceutics The Design and Manufacture of Medicines, Michael E. Aulton and Kevin M. G. Taylor, 4th edition, Page no.304

Q.8 **Which of the following masking agents is used to mask the Iron (II) ion during the complexometric titration:**

Ans
- ✗ A. Thioglycerol
- ✓ B. Ammonium fluoride
- ✗ C. Potassium cyanide
- ✗ D. Triethanolamine

Question Type : **MCQ**
Question ID : **50886140249**
Option 1 ID : **508861160991**
Option 2 ID : **508861160993**
Option 3 ID : **508861160992**
Option 4 ID : **508861160990**
Status : **Not Answered**
Chosen Option : **--**

Which of the following masking agents is used to mask the Iron (II) ion during the complexometric titration:

(a) Thioglycerol

(b) Ammonium fluoride

(c) Potassium cyanide

(d) Triethanolamine

Question to Claim

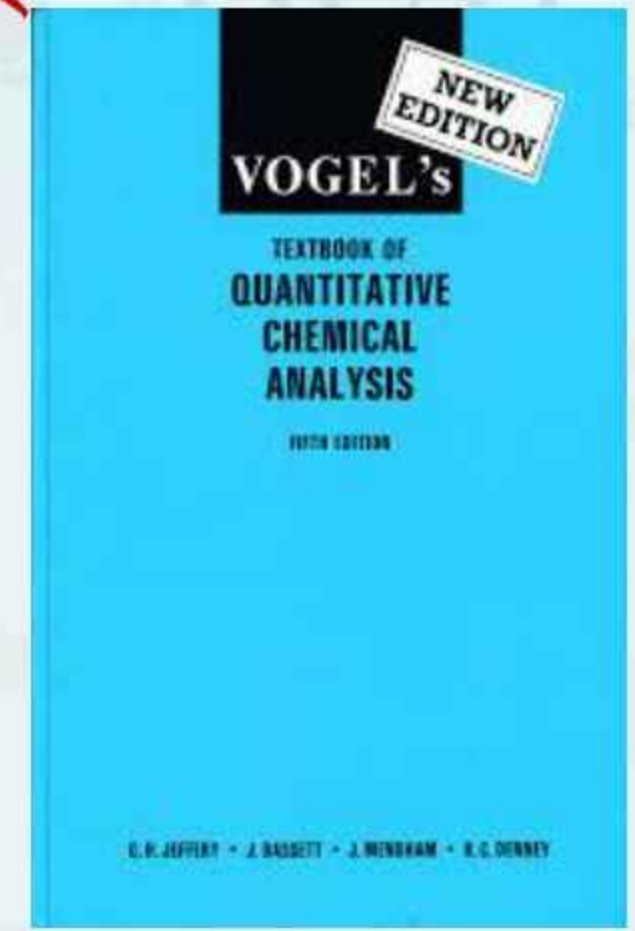
Both (b) and (d) are Correct Option

(*b*) Use of masking agents. Masking may be defined as the process in which a substance, without physical separation of it or its reaction products, is so transformed that it does not enter into a particular reaction. **Demasking** is the process in which the masked substance regains its ability to enter into a particular reaction.

By the use of masking agents, some of the cations in a mixture can often be 'masked' so that they can no longer react with EDTA or with the indicator. An effective masking agent is the cyanide ion; this forms stable cyanide complexes with the cations of Cd, Zn, Hg(II), Cu, Co, Ni, Ag, and the platinum metals, but not with the alkaline earths, manganese, and lead:

$$M^{2+} + 4CN^- \rightarrow [M(CN)_4]^{2-}$$

It is therefore possible to determine cations such as Ca^{2+}, Mg^{2+}, Pb^{2+}, and Mn^{2+} in the presence of the above-mentioned metals by masking with an excess of potassium or sodium cyanide. A small amount of iron may be masked by cyanide if it is first reduced to the iron(II) state by the addition of ascorbic acid. Titanium(IV), iron(III), and aluminium can be masked with triethanolamine; mercury with iodide ions; and aluminium, iron(III), titanium(IV), and tin(II) with ammonium fluoride (the cations of the alkaline-earth metals yield slightly soluble fluorides).



Reference:

1. Vogel's Textbook of Quantitative Chemical Analysis, 5th edition, Pg. no. 313

2. **Addition of complexing agents:** Addition of these complexing causes formation of complexes with interfering ions. These cor are more stable than the edetate complexes and thus elimination of impurities and selective titration can be done easily.

Interfering Ions	Complexing agents
Aluminium, Iron, Titanium	Ammonium flouride
Ferric	Ascorbic acid + Ferrocyanide
Mercury, Cadmium, Zinc, Arsenic, Antimony, Tin, Lead, Bismuth	Dimercaprol in alkaline medium
Mercury	Potassium Iodide
Aluminium, Titanium	Tiron
Aluminium, Iron	Triethanolamine
Silver, Copper, Mercury, Iron, Zinc, Cadmium, Cobalt, Nickel	Potassium cyanide in alkaline medium

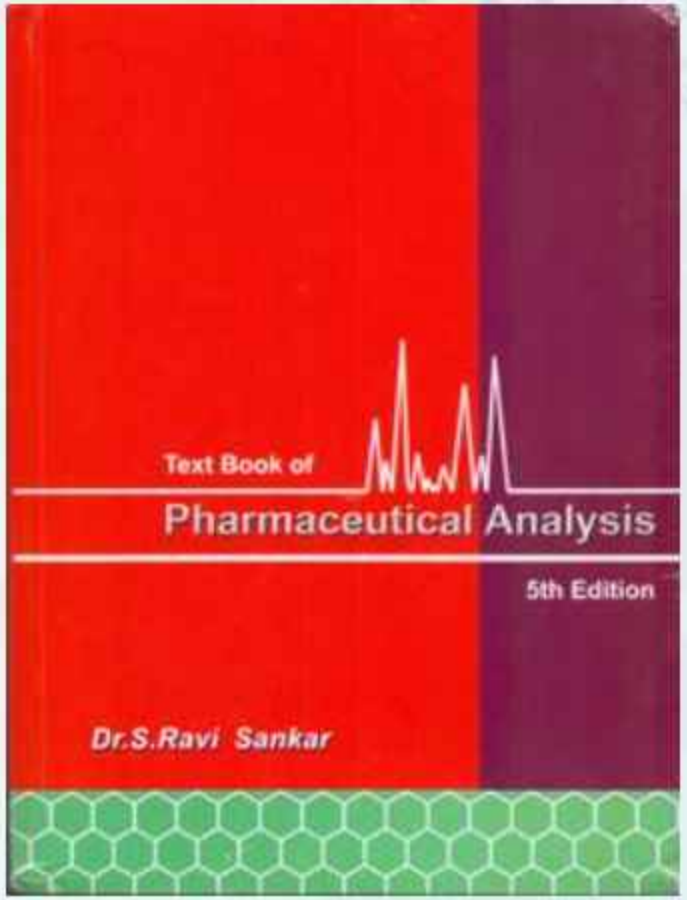
3. **pH control:** The edetate complexes with alkaline earth metals are not stable below pH 7. But in this pH region and upto pH 3, complexes with Tin (Sn^{4+}), Iron (Fe^{3+}), Cobalt (Co^{3+}) and Thorium (Th^{4+}) are stable and can be selectively titrated by varying pH.

Preparation of 0.05M disodium edetate

Dissolve 18.6g of disodium ethylene diamine tetetracetate in sufficient water to produce 1000ml and standardise the solution.

Standardisation of 0.05M disodium edetate
Method 1

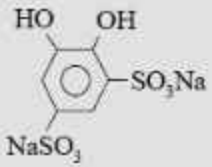
Weigh accurately 1.251g of calcium carbonate and transfer into a 250ml standard flask. Add minimum quantity of dilute hydrochloric acid to dissolve the calcium carbonate, by boiling off the carbondioxide. Cool and make upto volume with distilled water. Pipette out 20ml of this solution in to a conical flask, add 5ml of Ammonia - Ammonium chloride buffer and few drops of Calcon mixture as indicator (alternatively, Modernt Black II mixture or Eriochrome Black T or Solochrome Black T can be used). The contents of the flask are titrated against 0.05M disodium edetate (TV), until pink colour changes to full blue colour of the indicator. A blank titration is performed with only buffer and indicator and the volume of edetate (BV) is subtracted from that obtained in the first titration.

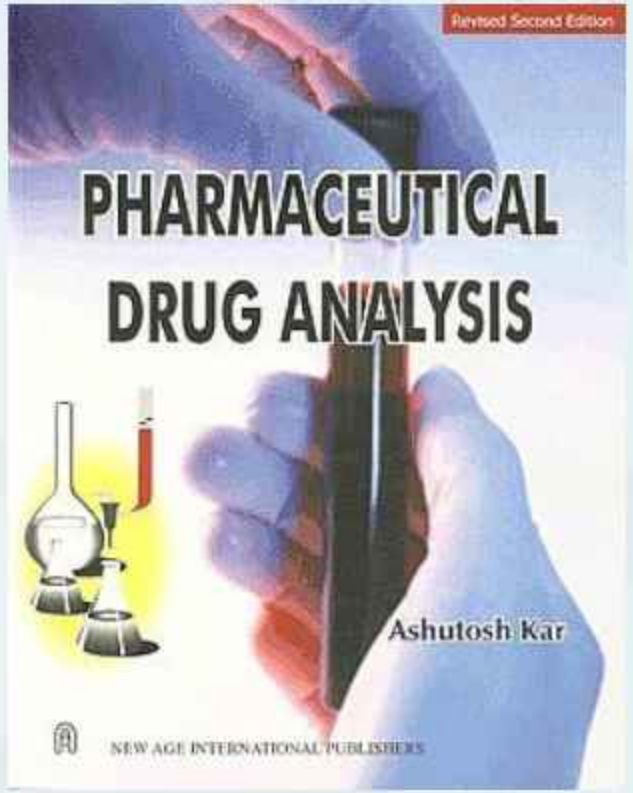


Reference:

2. Textbook of Pharmaceutical Analysis, 5th edition, Pg. no. 22-11

Table 9.3 : Masking Accomplished by Precipitation

S.No.	Interfering Heavy Metal Ions	Complexing Agent	Remarks
1.	Co^{2+}, Cu^{2+}, Pb^{2+}	Na_2S (sodium sulphide), CH_3CSNH_2 (Thioacetamide)	As insoluble sulphides and complexes
2.	Cu^{2+}	$HS.CH_2.CHOH.CH_2OH$ (Thioglycerol)	As insoluble complex
3.	Al^{3+}, Fe^{3+}, Ti^{3+}	NH_4F (Ammonium fluoride)	Complex formation
4.	Hg^{2+}, Cd^{2+}, Zn^{2+}, As^{3+}, Sb^{3+}, SN^{4+}, Pb^{2+}, Bi^{2+}	$HSCH_2.CHSH.CH_2OH$ (Dimercaprol)	Precipitation in weakly acidic medium while soluble in alkaline medium
5.	Hg^{2+}	KI (Potassium iodide)	Masks Hg^{2+} as HgI_4^{2-}
6.	Al^{3+}, Ti^{3+}	 (Disodium catechol-3, 5-disulphonate)	Forms colourless complexes
7.	Al^{3+}, Fe^{3+}, Mn^{3+}	$[N(CH_2CH_2OH)_3]$ (Triethanolamine)	Al-complex : colourless ; Fe-complex : Yellow ; Mn-complex : Green



Reference:

3. Pharmaceutical Drug Analysis, Pg. no. 168

Q.6 A structural hybrid of Meperidine and Methadone is:

Ans
- ✔ A. Diphenoxylate
- ✘ B. Pentazocine
- ✘ C. Lofentanil
- ✘ D. Loperamide

Question Type : **MCQ**
Question ID : **50886134126**
Option 1 ID : **508861136498**
Option 2 ID : **508861136501**
Option 3 ID : **508861136499**
Option 4 ID : **508861136500**
Status : **Not Answered**
Chosen Option : **--**

A structural hybrid of Meperidine and Methadone is:

(a) Diphenoxylate

(b) Pentazocine

(c) Lofentanil

(d) Loperamide

Question to Claim

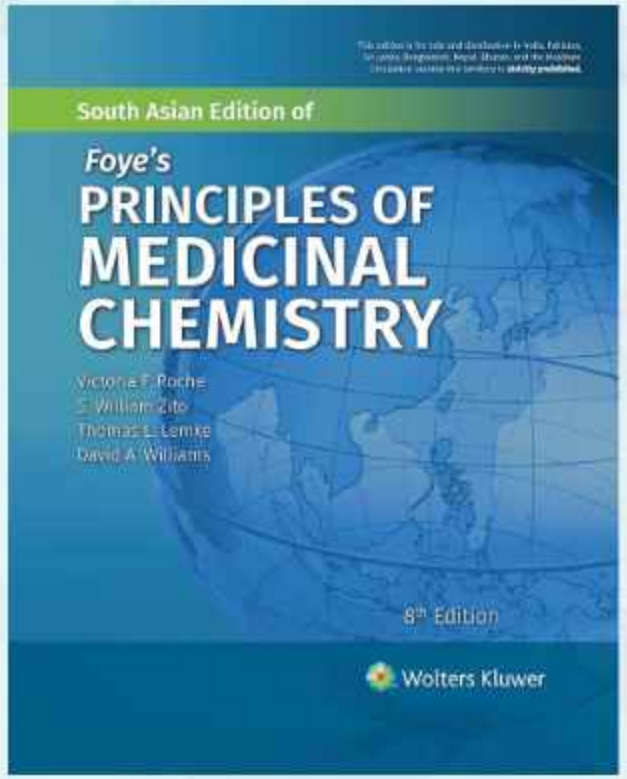
Both (a) and (d) are Correct Option

Diphenylheptanone

In the period just before or during the Second World War, German scientists synthesized another series of open-chain compounds as potential antispasmodics. In a manner analogous to that of meperidine, animal testing showed some of the compounds to possess analgesic activity. Methadone was the major drug to come from this series of compounds (Fig. 24.9). Methadone is especially useful for its oral activity and its long duration of action. These properties make methadone useful in maintenance therapy for opioid addicts and for pain suppression in the terminally ill (i.e., hospice programs). Methadone is marketed in the United States as a racemic mixture, but the (–)-isomer possesses almost all of the analgesic activity. Many variations on the methadone structure have been made, but little success in finding more useful drugs in class has been achieved. Reduction of the keto and acetylation of the resulting hydroxyl group gives the acetylmethadols (see below). Variations of the methadone structure have led to the discovery of the useful antidiarrheal opioids diphenoxylate and loperamide.

P.665

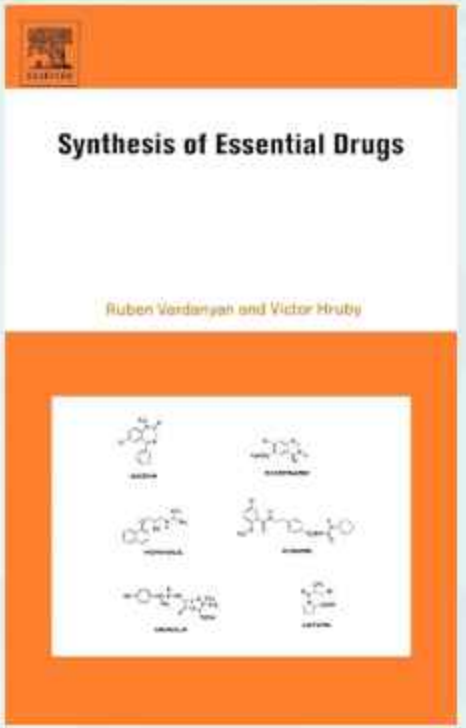
Propoxyphene is an open-chain compound that was discovered by structural variation of methadone. Propoxyphene is a weak μ opioid agonist having only one-fifteenth the activity of morphine. The (+)-isomer produces all of the opioid activity.



Reference:

1. **Foye's Principles of Medicinal Chemistry, Pg. no. 665**

Diphenoxylate: Diphenoxylate, ethyl ester of 1-(3-cyano-3,3-diphenylpropyl)-4-phenylpiperidine-4-carboxylic acid (3.1.58), is also a drug of 4-phenylpiperidine series. In practice there are two ways of making it. The first way is by the alkylation of the ethyl ester of 4-phenylpiperidine-4-carboxylic acid (3.1.56) with 2,2-diphenyl-4-bromobutyronitrile, which in turn is synthesized from 1-benzyl-4-phenyl-4-cyanopiperidine. The product undergoes ethanolysis in the presence of acid, followed by benzylation. The second way is a synthesis accomplished by alkylation of diphenylacetonitrile using ethyl ester of 1-(2-chloroethyl)-4-phenylpiperidine-4-carboxylic acid (3.1.57), which is synthesized by



Reference:

2. Synthesis of Essential Drugs