

GPAT 2013

What is mechanism of aprotinin?

- A) Inhibits carboxypeptidase
B) Inhibits plasminogen
C) **Inhibits plasmin**
D) Inhibits plasminogen activator

Absolute alcohol is prepared from spirit by _____.

- A) Distillation
B) **Azeotropic distillation**
C) Fractional distillation
D) All of the above

A compound with an -OH group and -OR group bonded to the same carbon atom is _____.

- A) an acetal
B) **a hemiacetal**
C) a simple ether
D) an aldol

The reaction of Grignard reagent with aldehydes and ketones gives alcohols. This is known as _____.

- A) **Nucleophilic addition reaction**
B) Nucleophilic substitution reaction
C) Electrophilic substitution reaction
D) Electrophilic addition reaction

Osazone is formed by reaction of _____ moles of phenylhydrazine with monosaccharide.

- A) 1
B) 2
C) **3**
D) 4

If a sugar contains _____ function, it is a reducing sugar.

- A) **hemiacetal**
B) acetal
C) aldehyde
D) ketal

Which of the following criteria should be considered when reviewing a medication for addition to the hospital formulary?

- A) The amount of samples provided to hospital physicians
B) Research funds donated to the hospital by the pharmaceutical company
C) **National adverse drug reaction reports**
D) Whether it is a gluten-free oral formulation

Identify the GABA reuptake inhibitor.

- A) Progabide
B) **Tigabine**
C) Bicuculline
D) Baclofen

What is the reason of complicated penetration of some drugs through brain-blood barrier?

- A) High lipid solubility of a drug
B) High endocytosis degree in a brain capillary
C) **Absence of pores in the brain capillary endothelium**
D) Meningitis

Reynold's number is given by _____.

- A) $Re = \frac{\eta}{\rho v D}$
B) $Re = \frac{\rho v}{\eta D}$
C) **$Re = \frac{\rho v D}{\eta}$**
D) $Re = \frac{v D}{\rho \eta}$

The increase in concentration of second messengers (cAMP, cGMP, Ca^{2+} etc.) leads to:

- A) Inhibition of intracellular protein kinases and protein phosphorylation
B) **Protein kinases activation and protein phosphorylation**
C) Blocking of interaction between a receptor and an effector
D) Antagonism with endogenous ligands

Which of the following cholinomimetics activates both muscarinic and nicotinic receptors?

- A) Lobeline
B) Pilocarpine
C) **Carbachol**
D) Bethanechol

Adverse effect of cerivastatin is _____.

- A) **higher risk of rhabdomyolysis**
B) Anaphylaxis
C) Hepatic disorder
D) Hemolytic anemia

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Following emigration from blood vessels, leucocyte migration to the site of infection or injury is mediated by:

- A) Bradykinin
B) Chemokines and Complement C5a
C) Histamine
D) Prostaglandins

Which of the following is interleukin agonist?

- A) Aldesleukin
B) Rituximab
C) Anakinra
D) Etanarecept

When the angle of repose exceeds _____, the powder flow is rarely acceptable for pharmaceutical manufacturing purpose.

- A) 25
B) 30
C) 50
D) 60

The chelate, EDTA^{4-} , can be described as what type of chelating ligand?

- A) Bidentate
B) Tetradentate
C) Hexadentate
D) Tridentate

Living cells are negatively charged inside primarily because of _____.

- A) ATP, organic acids, and other negative molecules that cannot escape.
B) removal of sodium ions, which are positively charged, by the Na^+/K^+ pump.
C) extrusion of Ca^{2+} ion, which is much more concentrated outside a cell than inside.
D) cell membranes that are more permeable to potassium than sodium.

Which of the following drugs requires administration on an empty stomach?

- A) Naproxen
B) Levothyroxine
C) Prednisone
D) Nitrofurantoin

Which of the following is a non-aqueous binder?

- A) Ethyl cellulose
B) Starch
C) Veegum
D) Bentonite

Which of the following cannabinoids is narcotic?

- A) Cannabichromene
B) Cannabinol
C) Cannabidiol
D) Tetrahydrocannabinol

What is the osmolality of a solution if one mmole of glucose and two mmoles of NaCl are dissolved in 1 Kg of the water?

- A) 3 mOsm
B) 4 mOsm
C) 5 mOsm
D) 6 mOsm

How much can be the working revolution per minute (RPM) of the ball mill ?

- A) $23-28 \sqrt{D}$ where D means the diameter of jar
B) two times more than the critical revolution per minute
C) $42.3 \sqrt{D}$ (D=diameter of the jar)
D) The average of critical RPM and the optimal RPM.

An extension of the normal pharmacological effect of a drug or its metabolite is termed as _____.

- A) Type AADR
B) Type B ADR
C) Type C ADR
D) Type D ADR

Heckel's plot represents _____.

- A) Extent of plastic and elastic deformation of material during compaction
B) Force-time or force-displacement relationship
C) Pressure-porosity (volume) relationship
D) Stress relaxation measurements

Which of the following would cause increase in the binding strength at the dry granulation process in significant degree?

- A) Carboxymethylamylopectinglycolate
B) Macrogol 4000
C) Magnesium Stearate
D) Lactose

The correct statements concerning coacervation microencapsulation.

1. Coacervation always leads to monophasic microcapsule.
2. When the gelatine is used for microcapsule's wall material, the coacervation is bound to happen on consequence of alcohol or salt (sodium sulfate) effect.
3. Only gelatine can be used for microcapsule's wall.
4. Simple or compound coacervation can be distinguished according to the number of macromolecular colloids taking part in the process.
5. The pH conditions of the system and the solubility of the auxiliary materials do not have any effect on the preparation of the microcapsule

- A) only 1 and 4 are correct
B) only 2 and 3 are correct
C) only 1 and 5 are correct
D) only 2 and 4 are correct

Cyclohexanone exhibits only _____ peaks in ^{13}C NMR spectrum due to symmetry.

- A) 2
B) 3
C) 4
D) 5

If an organic compound does not absorb UV visible radiation it means compound does not contain _____.

- A) Single bond
B) Sigma bond
C) Conjugated double bond
D) Dative bond

Which of the following parameters is/are important in determining bioequivalence?

- A) T_{max}
B) C_{max}
C) AUC and C_{max}
D) T_{max} and C_{max}

What does the Hammett substituent constant (σ) measure?

- A) The steric effect of a substituent
B) The electronic effect of a substituent
C) The hydrophobic effect of a substituent
D) The effect on pH of a substituent

Property exploited by electroanalytical technique of coulometry is _____.

- A) Electric potential
B) Electrical charge
C) Electrical current
D) Electrical resistance

ALL are true EXCEPT _____.

- A) Soft soaps give emulsions with a pH in the basic range.
B) Hard soaps form water-in-oil emulsions.
C) Water-soluble polymers favor the formation of water-in-oil (w/o) emulsions.
D) On the HLB System, lower numbers are assigned to lipophilic compounds while higher numbers are assigned to hydrophilic compounds.

In callus culture, roots can be induced by the supply of _____.

- A) Auxin and no cytokinin
B) Higher concentration of auxin and lower concentration of cytokinin
C) Higher concentration of cytokinin and lower concentration of auxin
D) Auxin and cytokinin in equal proportions

Deoxy position of deoxyribose in DNA is at _____.

- A) 1st carbon
B) 2nd carbon
C) 3rd carbon
D) 5th carbon

All are potent 3A4 inhibitors EXCEPT _____.

- A) antifungals (-azoles)
B) protease inhibitors (-avir)
C) macrolides (-mycin)
D) Barbiturates

'Probability of nonsterility' is given by _____.

- A) F value B) Z value C) D value D) None of the above

Which of the following is a selective medium for the growth of vibreocholerae ?

- A) Thayer Martin medium B) Cefoxitin cycloserine fructose agar
C) Skirrow's medium D) Thiosulfate citratr bile sucrose agar

Specific conductance unit is _____.

- A) Ohm cm^{-1} B) Mho cm^{-1} C) Ohm cm D) Ohm $^{-1}\text{cm}^{-1}$

Karplus curve is associated with which spectroscopy?

- A) UV B) Mass C) FTIR D) NMR

What are known as balsams?

- A) resins dissolved in volatile oil B) a mixture of volatile oils with sesquiterpenes
C) Solidified resin devoid of volatile terpenes D) polysaccharide mixed with volatile oil

Sesquiterpenes are formed from _____ in the plants.

- A) farnesyl-pyrophosphate B) geranyl farnesyl pyrophosphate
C) colouring material D) degraded products of triterpenes

Which of the following is a type of phytoestrogen?

- A) Lutein B) Indoles C) Isothiocyanates D) Genistein

In adults, drugs are an important cause of Fanconi's syndrome. Drugs that cause Fanconi's syndrome include which group below. Select ONE.

- A) antiretroviral agents, aminoglycosides, glucocorticoids
B) tenofovir, outdated tetracycline, cisplatin
C) cidofovir, galactose supplements, NSAIDs
D) cyclosporin, tenofovir, lamivudine

Which is the most prominent amino acid in the Gelatin?

- A) F B) W C) G D) Y

Which aerosol particles will be deposited in alveoli?

- A) $> 20 \mu\text{m}$ B) $< 0.6 \mu\text{m}$ C) 2 and $6 \mu\text{m}$ D) $1-2 \mu\text{m}$

Drugs that show nonlinear pharmacokinetics have which of the following property?

- A) A constant ratio of drug metabolites is formed as the administered dose increases.
B) The elimination half-life increases as the administered dose increases.
C) The area under the plasma drug concentration versus time curve increases in direct proportion to an increase in the administered dose.
D) Both low and high doses follow first -order elimination kinetics.
E) The steady-state drug concentration increases in direct proportion to the dosing rate.

Which of the following pair of volumetric method of argentometric titration and indicator used is matched correctly.

- | | |
|--------------------|-------------|
| 1 Fajan's method | Chromate |
| 2 Mohr's method: | Fluorescein |
| 3 Vohlard's method | Ferric salt |

The method and indicator matches correctly in _____.

- A) 1 and 2 only B) 2 and 3 only C) 3 only D) 2 only

The reaction of the citric acid cycle that is most similar to the pyruvate dehydrogenase complex catalyzed conversion of pyruvate to acetyl-CoA is the conversion of:

- A) citrate to isocitrate B) fumarate to malate
C) malate to oxaloacetate D) α -ketoglutarate to succinyl-CoA

Which one of the following pairs of lipids & related compounds exhibit opposite biological activities?

- A) 5-HPETE & leukotriene D4 B) Cholic acid & Lithocholic acid
C) Thromboxane A2 & Prostacyclin(PGI₂) D) Acetone & β -hydroxybutyrate

HIV may NOT respond to _____.

- A) Nucleoside analogues B) Protease inhibitors
C) Neuraminidase inhibitors D) Reverse transcriptase inhibitors

Palmitic, oleic or stearic acid ester of cholesterol used in manufacture of cosmetic creams is _____.

- A) Oleo oil B) Lanoline C) Spermaceti D) Chaulmoogra oil

Appropriate reasons for the deviation from the Beer's law among the following are

- P] Monochromaticity of light Q] Very high concentration of analyte
R] Association of analyte S] Dissociation of analyte
A) P, Q, and R B) Q, R and S C) P, R and S D) P, Q and S

An alternative to glycolysis pathway is _____.

- A) Glyoxylate pathway B) Pentose phosphate pathway
C) Citric acid cycle D) Gluconeogenesis

LeChâtelier's principle states that increasing temperature favors a reaction that _____.

- A) releases energy as heat B) requires energy as heat
C) involves a chemical catalyst D) involves an enzyme

In absorption spectrometry, high values of absorbance values (greater than 1 or 2) tend to give poorer precision because:

- A) too much light saturates the detector B) little light reaches the detector
C) Beer's law deviations are worse D) monochromators work poorly under intense light

According to Lipinski's rule of 5, which of the following properties of drug molecules are likely to cause poor oral absorption?

- A) a molecular weight lesser than 500 B) a log P less than 5
C) less than 5 hydrogen bond donors D) more than 10 hydrogen bond acceptors

Polarographic method of analysis to obtain individual amounts of Cu^{2+} and Cd^{2+} in a given mixture of the two ions (Cu^{2+} and Cd^{2+}) is achieved by measuring their _____.

- A) half-wave potentials B) migration currents C) decomposition potentials D) diffusion currents

Which of the following phytohormone usually acts as bud inhibitor?

- A) Gibberlin B) Cytokinin C) Zeatin D) Indole Acetic Acid

The positively polarized carbon atom of a carbonyl group acts as _____.

- A) an electrophile and a Lewis base
- B) a nucleophile and a Lewis acid.
- C) a nucleophile and a Lewis base
- D) an electrophile and a Lewis acid.

The pinene hydrochloride rearranged into bornylterpenoid is called as _____.

- A) Wagner-Meerwein rearrangement
- B) Pinacol rearrangement
- C) Fries rearrangement
- D) Beckmann rearrangement

The mouse model for type I diabetes mellitus is _____.

- A) NZB mouse
- B) SCID mouse
- C) Nude mouse
- D) NOD mouse

Cholesterol contributes to _____ of the biological membrane.

- A) Rigidity
- B) Fluidity
- C) Permeability
- D) Osmolarity

Active site for all serine proteases consists of which triad?

- A) Ser-Glu-Asp
- B) Ser-Glu-Met
- C) Ser-His-Asp
- D) Ala-Glu-Met

What is the main difference between HPLC and UPLC?

- A) HPLC is reverse-phase whereas UPLC is normal-phase
- B) UPLC employs smaller stationary-phase particle size
- C) HPLC and UPLC employ different mobile phases
- D) HPLC and UPLC employ different detection methods
- E) HPLC operates at higher mobile phase pressures

Which drug is associated with hepatic/renal toxic metabolite, N-acetyl-p-benzoquinone?

- A) Diclofenac
- B) Meclofenamate
- C) Indomethacin
- D) Acetaminophen

What is the percentage of chlorpromazine ($pK_a = 9.3$) existing in ionised form in a solution of chlorpromazine hydrochloride at pH 7.4?

- A) 98.76
- B) 1.24
- C) 0.32
- D) 99.68

_____ is needed for suspensions, lotions, emulsions, creams and ointments to keep a high container consistency and yet pour and spread easily when needed. It also is satisfactory for IM slow release yet easy to inject.

- A) Thixotropy
- B) Rheopecty
- C) Rheology
- D) Newtonian flow

The enzyme superoxide dismutase (SOD) converts:

- A) O_2^- to hydrogen peroxide (H_2O_2)
- B) hydrogen peroxide (H_2O_2) to H_2O
- C) H_2O to hydroxyl ($HO\cdot$) radicals
- D) O_2^- to O_2

For first-order reactions the rate constant, k, has the units as _____.

- A) $M s^{-1}$
- B) $M^{-1} s^{-1}$
- C) $M^2 s^{-1}$
- D) s^{-1}

Which of the following may be used to assess the relative bioavailability of two chemically equivalent drug products in a crossover study?

- A) Dissolution test
- B) Peak concentration
- C) Time-to-peak concentration
- D) Area under the plasma level time curve

A 25.0 mL sample of a solution of a monoprotic acid is titrated with a 0.115 M NaOH solution. The titration shows equivalence point at 7.05. Which of the following indicators would be best for this titration?

- A) Methyl red
- B) Bromthymol blue
- C) Thymol blue
- D) Phenolphthalein

Which of the following is termed as mass filter?

- A) Time of flight B) Farady cup C) Quadupole D) Ion trap

Which of the following is produced in phenyl propanoid pathway?

- A) Phenolics B) Carotenes C) Alkaloids D) Terpenes

Which of the following is a GLP-1 agonist?

- A) Sitagliptin B) Pramlintide C) Exenatide D) Epalrestat

Attachment of polyethylene glycol (PEG) to proteins/drugs do all of the following EXCEPT

- A) protect them from rapid hydrolysis or degradation
B) improves macromole solubility
C) increase absorption from the gut
D) minimizing the uptake by the cells of the reticuloendothelial systems

Identify the harmful drug-drug interaction.

- A) Imipenem - Cilastatin B) L-Dopa - Entacapone
C) Meperidine - Pargyline D) Methotrexate - Leucovorin

Prostaglandin used in the treatment of postpartum hemorrhage is _____.

- A) Carboprost B) Latanoprost C) Bimatoprost D) Travoprost

Identify 5HT₃ receptor antagonist which is 5HT₄ agonist also.

- A) Metoclopramide B) Cispride C) Cilasetron D) Granisetron

Which of the following AT-II receptor antagonists (SARTANS) does not possess tetrazole moiety in its structure?

- A) Losartan B) Irbesartan C) Telmisartan D) Valsartan

What useful information can be found from a Van Deemter plot?

- A) Optimum selectivity factor B) Optimum mobile phase flow rate
C) Optimum column temperature D) The capacity factor

Brockman Activity Scale' is used in the characterization of _____.

- A) Stationary phase B) Mobile phase C) Buffer system used D) Column specification

Drugs that have been found to be useful in one or more types of heart failure include all of the following EXCEPT _____.

- A) Na⁺/K⁺ ATPase inhibitors B) α adrenoceptor agonists
C) β adrenoceptor agonists and antagonists D) ACE inhibitors

Which of the following is selective α_2 selective antagonist

- A) Clonidine B) Prazocin C) Phentolamine D) Yohimbine

Which one of the following is NOT a protoplast fusion agent?

- A) Inactivated Sendai virus B) Ca⁺⁺ at alkaline pH
C) Polyethylene glycol D) Colchicine

Clinically used Labetolol is _____.

- A) S, S B) R, R C) R, S D) S, R

For intramuscular injection, angle of administration is _____ degrees.

- A) 30 B) 45 C) 60 D) 90

Aromatase is an enzyme complex that is the target for several anticancer drugs. Which of the following anticancer drugs targets aromatase?

- A) Cyproterone acetate
- B) Raloxifene
- C) Aminoglutethimide
- D) Testosterone propionate

Vinca alkaloids that are used in combination therapy to treat a variety of tumors. How do cancer cells normally gain resistance to these agents?

- A) Mutation of the target structure
- B) Overexpression of the carrier protein called P-glycoprotein
- C) Increased metabolism of the drug
- D) Decreased ability of the drug to enter target cells

A set of closely related genes or genetic markers that are inherited as a single unit is

- A) Cistron
- B) Gene families
- C) Haplotype
- D) Haploid

Which one of the following is used in the Ames test?

- A) *E.coli*
- B) *Streptococcus aureus*
- C) *Pseudomonas aerogenosa*
- D) *Salmonella typhimurium*

Which of the following is ultraashort acting adrenergic blocker?

- A) Carvedilol
- B) Atenolol
- C) Esmolol
- D) Acebutolol

A diode array detector coupled with UV detection is advantageous because it:

- A) covers a range of wavelengths.
- B) allows lower concentrations of analyte to be detected.
- C) speeds up the detection at a single wavelength.
- D) allows a single wavelength of detection to be more precisely chosen.

The LOD of an analysis is at the femtogram level. This corresponds to detection at the:

- A) 1 in 10^{-18} level
- B) 1 in 10^{-15} level
- C) 1 in 10^{-12} level
- D) 1 in 10^{-9} level

Which are those therapeutic systems, which liberate the active ingredient through a special hole, prepared by laser?

- A) TTS patches
- B) IUD systems
- C) OCUSERT systems
- D) OROS systems

Which of the following chromatographic techniques is most suitable for small, nonvolatile, water-insoluble solutes?

- A) GC
- B) reverse phase LC
- C) normal phase LC
- D) SEC

Which of the following antiviral agent is not a nucleoside analog?

- A) Moroxidin
- B) Vidarabine
- C) Cytarabine
- D) Idoxuridine

Regarding two compartment pharmacokinetics all are true EXCEPT:

- A) a drug is always removed from the peripheral compartment
- B) a drug with a high volume of distribution is likely to be lipophilic
- C) a drug can have a short duration of action while being eliminated very slowly
- D) most anaesthetic drugs are modelled well with a two-compartment model

Match the following biochemical transformations with coenzymes involved.

- i. α -ketoglutarate to glutamic acid
- a. tetrahydrofolate

ii. uridine to thymidine

iii. Pyruvic acid to acetyl coenzyme A

b. NADH

c. thiamine pyrophosphate

d. pyridoxamine

A) i-d, ii-a, iii-c

B) i-a, ii-b, iii-d

C) i-b, ii-a, iii-c

D) i-d, ii-b, iii-c

The FDA allows a maximum of _____ salicylic acid in commercial aspirin tablets.

A) 0.05 %

B) 0.1%

C) 0.15%

D) 0.25%

A phenolic acid compound isolated from the ripe fruits of myrobalan (haritaki) _____.

A) Chebulic acid

B) Ferulic acid

C) Emblicanin

D) Pivalic acid

Asafoetida + Nitric acid gives _____.

A) reddish-brown colour

B) green colour

C) yellowish-orange colour

D) blue fluorescence

Endocrine effects of antipsychotic like chlorpromazine include all of the following EXCEPT:

A) Decrease in adrenocorticotrophins, Decrease in gonadotrophins

B) Decrease in release of pituitary growth hormone

C) Increase in prolactin secretion

D) Decrease in thyroid hormone production

The most widely used agent for the treatment of acute gout arthritis is _____.

A) Indomethacin

B) Allopurinol

C) Colchicine

D) Probenecid

Which of the following actions of norepinephrine would be antagonized by prazosin but not by propranolol?

A) Increased heart rate

B) Mydriasis

C) Releases of rennin

D) Glycogenolysis

Arginine serves as a precursor for which of the vasodilatory product?

A) Bradykinin

B) Atrial natriuretic peptide

C) Nitrous oxide

D) L-Citrulline

Which of the following is a test of digitoxose?

A) Keller Kiliani's

B) Kedde's reagent

C) Raymond's reagent

D) Baljet's reagent

The Vd for phenytoin is 70 L and half life is 1.5 hours. What is the total clearance of phenytoin?

A) 34.32 L/h

B) 32.34 L/h

C) 151.5 L/h

D) 51.51 L/h

For electrophilic aromatic substitution reactions, which substituent possesses all of the following properties _____.

1) inductive electron withdrawer;

2) electron donor by resonance;

3) ring deactivator

A) -Cl

B) -NO₂

C) -COCH₃

D) -OCH₃

Phenothiazine is obtained by _____ with sulfur.

A) Cyclization of dibenzyl amine

B) Cyclization of diphenyl amine

C) Reduction of diphenyl amine

D) Reduction of dibenzyl amine

Vitamin K is constituted of _____ ring.

A) Hydroquinone

B) Naphthaquinone

C) Ionone

D) Benzimidazole

To balance intellectual property protection, competition and access to affordable prescription drug, the act made by US government is

- A) Drug Price Competition act
B) Patent Term Restoration Act
C) Hatch-Waxman act
D) Orphan Drug Act

Ginseng saponins belong to the series of _____.

- A) Lupane
B) Ursane
C) Oleanane
D) Dammarane

Stokes Einstein equation is related to _____.

- A) Energy changes in sedimentation suspension settling
B) Sedimentation of suspension
C) Diffusion coefficient
D) Coefficient of energy consumption

The source of radiation for FAR IR spectrometer is _____.

- A) Golay cell
B) Nernst glower and globalar
C) Mercury lamp
D) Highly heated tungsten filament

Which of the following alkaloids derived from lysine?

- A) Emetin
B) Cinchonidin
C) Brucin
D) Lobelin

The agent that can only be given intravenously for heart failure is _____.

- A) Digoxin
B) Amiodarone
C) Quinidine
D) Dobutamine

A prescription order for an antibiotic preparation includes the directions, "ii gtt AU q.i.d."

What auxiliary label should be affixed to the prescription order container?

- A) Take with meals
B) For the eye
C) For rectal use
D) For the ear

Which one of the following amino acid residues is specifically recognized by chymotrypsin during peptide bond cleavage?

- A) Phe
B) Leu
C) Val
D) Asp

Grignard test is used for the detection of _____.

- A) Flavonoids
B) S-glycosides
C) Cyanogenetic glycosides
D) O-glycosides

Which hormone works antagonistically to parathormone _____.

- A) Triiodothyronine
B) Insulin
C) Estrogen
D) Calcitonin

Synthesis of thyroid hormone is inhibited by all EXCEPT _____.

- A) Propyl thiouracil
B) Methimazole
C) Perchlorate
D) Diatrizoate

Alkaline hydrolysis of one mole of γ -truxilline yields _____.

- A) γ - Ecgonine base (one mole) + γ -Truxillic acid (one mole) + Methanol (one mole)
B) Methyl ecgonine base + γ -Truxillic acid (one mole) + (one mole)
C) Methyl ecgonine base (one mole) + γ -Truxillic acid (one mole)
D) Ecgonine base (two moles) + γ -Truxillic acid (one mole) + Methanol (two moles).

Which of the following is a common herbal remedy for insomnia?

- A) Milk thistle
B) Echinacea
C) Eucalyptus
D) Valerian

In which category of in vitro in vivo correlation the mean in vitro dissolution time is compared either to the mean residence time or to the mean in vivo dissolution time?

- A) A
B) B
C) C
D) D

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