

E. Ammonium (NH₄)

- Hypothetical alkali metal
- Pcol action:
 - a. Diuretic
 - b. Buffer
 - c. Expectorant (like Iodide)
 - d. Anti-cariogenic (like Fluoride)

Household ammonia – contains 10% NH₄; is known as 16° ammonia

Ammonium Bromide		Depressant/Sedative
(NH ₄) ₂ CO ₃ Ammonium carbonate	<i>Sal volatile</i> <i>Hartshorn</i> <i>Preston Salt</i> <i>Baker's Ammonia</i> <i>Ammonium Sesquicarbonate</i>	Expectorant (ammonium) Antacid (carbonate) Basis of smelling salts (aromatic spirit of ammonia)
Aromatic NH ₄ Spirit	<i>Spirit of Hartshorn</i> <i>Spirit sal volatile</i>	Respiratory stimulant
NH ₄ Cl	<i>Muriate of hartshorn</i> <i>Ammonium Muriate</i> <i>Sal Ammoniac</i> <i>Salmiac</i>	Expectorant, Diuretic, Urinary acidifier In impaired hepatic function Treatment for Brominism
HgNH ₂ Cl	<i>Mercuric Ammonium Chloride</i> <i>Ammoniated mercuric chloride</i> <i>White mercurate</i>	Topical anti-infective
NH ₄ I	<i>Ammonium Iodide</i>	Source of iodide, expectorant, antifungal
NH ₄ CH ₃ COO Ammonium acetate	<i>Spirit of minderesus</i>	Styptic
Strong Ammonia Solution	<i>Ammonia Hydroxide</i> <i>Stronger Ammonia Water</i>	Diluted Ammonia Solution circulatory stimulant by inhalation
Ammoniacal AgNO ₃	<i>Howe's solution</i>	

F. CESIUM

- Catalyst in polymerization of resin forming material

C. CALCIUM

- 2nd most abundant cation in extracellular fluid
- Vit. D is needed for its maximum absorption
- PTH controls Ca levels in the blood ————— Hyperpara @ HyperCa @ Hypophos
- Pcol action:
 1. Coagulation
 2. Contraction
 3. Release of neurotransmitter
 4. Bones and teeth (98-99%)
- Deficiency states:

Osteoporosis (density) Osteomalacia (resorption) Rickets (mineralization) Hypocalcemia

CaBr ₂		Sedative/depressant
CaCO ₃	<i>Precipitated Chalk</i> <i>Carbonic Acid</i> <i>Calcium Salt</i> <i>Creta Praecipitata</i>	Antacid, Ingredient of toothpaste, dentrifices
CaCl ₂	<i>Muriate of lime</i> <i>Fosforo de Homberg</i>	Ca replenisher
Ca gluconate		Ca supplement and replenisher Heart failure
Ca(OH) ₂	<i>Slaked lime</i> <i>Milk of lime</i> <i>Calcium hydroxide</i>	Antacid, Saponifying agent
Ca(C ₃ H ₅ O ₃) ₂	<i>Calc lactate</i>	Ca supplement
Ca ₁₀ (PO ₄) ₆ ·2H ₂ O		Source of Ca and PO ₄
CaO	<i>lime, quicklime, calx</i>	Component of Bordeux mixture , Insecticide
Ca ₃ (PO ₄) ₂	<i>Bone ash</i>	Antacid
CaClO	<i>Chlorinated lime</i> <i>Chloride of lime</i>	Disinfectant, Bleaching agent
CaSO ₄ • ½ H ₂ O or 2 H ₂ O	<i>Gypsum</i> <i>Terra alba</i> <i>Satin Spar</i> <i>Alabaster Light</i>	Rodenticide, Prep of surgical casts and dental impressions <i>Plaster of Paris</i> – calcium sulfate hemihydrate

D. STRONTIUM

1. SrCl₂ - Temperature desensitizing agent (Sensodyne®)

E. BARIUM (Heavy)

- Baritosis | Epsom salt
 1. BaSO₄ *Ba meal, Esophotrast* - radiopaque for GIT imaging (non-toxic since not soluble)
 2. Ba(OH)₂ *Baryte* - CO₂ absorbent

F. RADIUM

- Radioactive element used for cancer radiotherapy & diagnostic purpose

GROUP IVA

A. CARBON

- Crystalline: *Diamond* (purest native form) and *Graphite* (lead pencil)
- Amorphous: *Coal* and *Anthracite*
 1. CO_2 - acne, warts, corns, calluses, eczema, persistent hiccups (*most potent resp. stimulant*)
 2. CO_3 - Antacid, pharmaceutical for effervescent tablet
 3. CO - 210x greater affinity to hemoglobin than oxygen leading to asphyxia then death
 - Targets *cytochrome oxidase*
 - Pathogonomic of CO poisoning: **Cherry red color of blood and mucous membranes**
 - Treatment:
 1. 100% O_2
 2. Artificial air (He 80%, O_2 20%)
 3. Hyperbaric O_2

B. SILICON

- 2nd most abundant element, Component of glass
 1. SiO_2 - Toxicity: silicosis
 2. Glass *Sodium silicate, Na_4SiO_4* Na_2CO_3 + pure silica
 3. Purified Siliceous Earth - Adsorbent
 4. Kaolin *Native **hydrated** aluminum silicate* - Adsorbent
 5. Bentonite *Native **colloidal** hydrated aluminum silicate* - Suspending agent
 6. Talc *French Chalk, Piedra Grasa, Soapstone, Creta Gallica* - Clarifying, dusting
 7. Attapulgit *Pyrophyllite, Diatabs, Quintess* - Adsorbent
 8. Simethicone *Polymeric dimethylsiloxane* - Antiflatulent
 9. Asbestos

Silicates of:

Mg (talc, asb)

Al (k, b, p)

Zn (calamine)

C. TIN (*Stannum*)

1. SnF_2 - anticariogenic 8% solution
2. SnO_2 - germicide for Staph infection

D. LEAD (*Plumbum*)

- Astringent, Protein Precipitant
- **Plumbism** | **EDTA**, **Ca Versenate** (adults) , **Succimer** (kids)
 1. $\text{Pb}(\text{CH}_3\text{COO})_2$ *Sugar of Lead, Burrow's sol'n* - astringent
 2. $\text{Pb}_2(\text{CH}_3\text{COO})$ *Goulard's extract* - astringent, antiseptic
 3. PbO *Litharge®* ----- cans (toxic)

I	- borosilicate
II	- treated SL
III	- soda lime
NP	- gen. SL
B	- coeff of expansion
K	- brown
Pb	- ↑ refractive index

GROUP IVB

A. TITANIUM (*Titan, Sons of the Earth*)

- Powerful reducing agent
 1. TiO_2 - Opacifying agent (Ocuser®) and UV ray protectant

B. ZIRCONIUM

- antiperspirant but banned due to granuloma formation

GROUP VIIA: HALOGENS (Salt-forming group)

A. FLUORINE

- Strongest oxidizing agent
- **Fluorosis** (Mottled enamel, Abnormal bone growth)
 1. NaF - anticariogenic at 2% solution
 2. SnF₂ - anticariogenic at 8% solution
 3. Na₂FPO₃ - anticariogenic
 4. CCl₂F₂ - refrigerant, aerosol propellant (Freon®)

B. CHLORINE (*Dephlogisticated muriatic acid*)

- Most abundant extracellular anion, **green** gas
- Used as water disinfectant
 1. Hypochlorite (Na, K) - bleaching agent
 2. HCl (*Muriatic acid, Spirit of Sea Salt, Marine Acid, Espiritu de Sal Marine*) - treatment of achlorhydria

C. BROMINE

- **Dark reddish brown** fuming liquid with suffocating odour
- Sedative/depressant
- **Brominism** (Skin eruption, Polyarthralgia, Weakness, Headache) NaBr and NH₄Br

D. IODINE

- Oldest known germicide
- Expectorant, Antifungal
- Preparation of T₃ and T₄
- Deficiency: **Goiter**
- Elemental Iodine preparation:
 1. Strong Iodine Solution (Lugol's Solution) - 5%
 2. Iodine Solution - 2%
 3. Iodine Tincture - 2% with 50% alcohol
 4. Povidone-Iodine (Betadine®) - PVP (nonionic surfactant)

E. ASTATINE

- Only metallic
- Only synthetic halogen
- Only radioactive halogen

Preview from Notesale.co.uk
Page 27 of 40

GASTROINTESTINAL AGENTS

Inorganic agents used to treat gastrointestinal disorders include:

- 1 antacids - products for altering gastric pH
- 2 protectives for intestinal inflammation
- 3 adsorbents for intestinal toxins
- 4 cathartics or laxatives for constipation

Stomach pH: 1 when empty to 7 when food is present

Gastritis – specified circumscribed erosion

Peptic ulcer or Esophageal ulcer (heartburn) occurs when the esophageal sphincter is defective due to gastric food entering the esophagus during a belch or upon lying in bed; emotional makeup is also a factor. *Malignancy and hemorrhage* are common with *gastric ulcers*. *Perforation* is more common with *duodenal ulcers*.

Antacids - alkaline bases used to neutralize the excess gastric HCl associated with gastritis and peptic ulcers

- a. should not be absorbable or cause systemic alkalosis
- b. should not be a laxative or cause constipation
- c. should exert the effect rapidly and over a long period of time
- d. reaction with gastric HCl should not cause a large evolution of gas
- e. should buffer in the pH 4-6 range
- f. should probably inhibit pepsin

COMBINATION ANTACID PREPARATIONS

- a. Aluminum Hydroxide Gel-Magnesium Hydroxide (*Aludrox, Maalox, Mialox, Creamalin*)
- b. Aluminum Hydroxide Gel-Magnesium Trisilicate (*Gelusil, Tricreamalut, Triosgel*)
- c. Magaldrate – Aluminum Hydroxide & Magnesium Hydroxide (*Niphan*)
- d. Simethicone-Containing Antacids (*Di-gel, Mylanta, Kremlins*) – simethicone - defoaming agent
- e. Alginic acid-sodium Bicarbonate-Containing antacids (*Gaviscon, Fomtab*)

PROTECTIVES AND ADSORBENTS – mild diarrhea

Diarrhea - when some factor impairs digestion and/or adsorption, thereby increasing bulk of intestinal tract

Acute Diarrhea - caused by *bacterial toxins, chemical poisons, drugs, allergy and disease*

Chronic Diarrhea - from GI surgery, carcinomas, chronic inflammatory conditions & various adsorptive defects).

BISMUTH-CONTAINING PRODUCTS

- intestinal *hydrogen sulfate* acts upon *bismuth salts* to form *bismuth sulfate* (result: black stools)

SALINE CATHARTICS (purgatives)

- o Laxatives – mild cathartics, prolonged use causes “Laxative habit”
 1. Stimulant Laxatives – act by local irritation
 2. Bulk-forming Laxatives – from cellulose and other non-digestible polysaccharides which swell when wet
 3. Emollient Laxatives – lubricants or stool softeners (e.g. *Mineral Oil*)
 4. Saline Cathartics – increase osmotic load of GI tract

NON-OFFICIAL SALINE CATHARTICS

Sodium Sulfate (*Glauber's Salt*)

Potassium Phosphate (*Dibasic Potassium Phosphate, Dipotassium Hydrogen Phosphate, DKP*)

Potassium Bitartrate (*Cream of Tartar, Potassium Acid Tartrate, Potassium Hydrogen Tartrate*)

Calomel (*Mercurous Chloride, Mild Mercury Chloride*)

METAL OR ANION	COLOR REACTIONS	
Acetate (CH_3COO^- or $\text{C}_2\text{H}_3\text{O}_2^-$)	$\text{H}_2\text{SO}_4 + \text{Ethanol (CH}_3\text{C}_2\text{OH)}$	⓪ fruity odor (ethyl acetate)
Aluminum (Al)	+ Ammonium TS + Aluminon reagent	⓪ gelatinous ppt that dissolves in excess Ammonium TS ⓪ red lake
Ammonium thiocyanate (NH_4SCN)	+ cobalt solution (acidic) + Ferric salts	⓪ intense blue colored complex at interface ⓪ blood red Fe(SCN)_3 (ferric thiocyanate)
Arsenate (AsO_4^{3-})	+ Silver nitrate TS + Ammonium molybdate test	⓪ chocolate brown soluble in HNO_3 ⓪ yellow ppt
Arsenites (AsO_3^{3-})	+ Silver nitrate TS + Magnesia mixture	⓪ yellow ppt soluble in HNO_3 ⓪ differentiating test for arsenates & arsenites
Borates (BO_3^{3-})	+ $\text{H}_2\text{SO}_4 + \text{methanol (CH}_3\text{OH)}$ + Turmeric paper	⓪ green bordered flame ⓪ orange + NaOH ⓪ olive green
Bromine (Br)	+ CCl_4 (carbon tetrachloride)	⓪ Orange color
Carbonate (CO_3^{2-})	+ acidic aqueous solution + Phenolphthalein	⓪ effervescence ⓪ red
Chloride (Cl^-)	+ AgNO_3	⓪ white curdy ppt, soluble in NH_3 , insol in HNO_3
Citrate ($\text{C}_6\text{H}_5\text{O}_7^{3-}$)	+ pyridine + acetic anhydride (3:1)/Denige's reagent *Denige's test is the differentiating test between citrates and tartrates	⓪ carmine red
Chromium	+ NaOH	⓪ grayish green slug, which dissolves with excess reagent
Cobalt	+ NaOH + potassium nitrate (KNO_3) / acetic acid + α -nitro- β -naphthol	⓪ blue ppt of Co(OH)_2 (boiling) ⓪ olive green ⓪ rose green ⓪ yellow ppt ⓪ brown ppt soluble in HCl
Copper	+ Ferric chloride + potassium ferrocyanide	⓪ deposit of red film on iron ⓪ green ppt forming a blue solution with ammonia
Iodide	+ Chlorine water or KMnO_4 solution + $\text{H}_2\text{SO}_4 + \text{sodium bisulfite (cold)}$ + $\text{H}_2\text{SO}_4 + \text{oxalic acid (hot)}$	⓪ violet color ⓪ decolorized ⓪ decolorized
Nickel	+ dimethylglyoxime + α -nitro- β -naphthol	⓪ bright red crystalline ppt insoluble in NH_3 ⓪ reddish brown ppt soluble in HCl
Phosphate (PO_4^{3-})	+ Silver nitrate + Ammonium molybdate	⓪ yellow ppt ⓪ yellow ppt in HNO_3 and NH_3
Potassium (K)	+ Tartaric acid *Potassium bitartrate is the only insoluble compound of potassium	⓪ white crystals of potassium bitartrate insoluble in ethanol and glacial acetic acid but soluble in NaOH
Saccharin	Fluorescein test: Resorcinol + $\text{H}_2\text{SO}_4 + \text{excess NaOH}$	⓪ fluorescent green liquid
Salicylate	+ Ferric chloride (FeCl_3) + Acids	⓪ violet color ⓪ white ppt of salicylic acid
Silver (Ag)	+ HCl	⓪ white curdy ppt insoluble in HNO_3 but soluble in NH_3
Tartrate	+ Pyridine + acetic anhydride (3:1)	⓪ emerald green
Thiosulfate ($\text{S}_2\text{O}_3^{2-}$)	+ HCl + FeCl_3	⓪ white ppt turning yellow ⓪ dark violet which quickly disappears
Zinc	H_2S	⓪ white ppt of ZnS (only white sulfide)

Preview from Notesale.co.uk
page 36 of 40