

Diuretics

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Definition

Diuretics are drugs that promote the excretion of sodium (Na^+) or chloride (Cl^-) or bicarbonate (HCO_3^-) ions and water from the body, the net result being an increase in urine flow. **Diuretics exert their effect directly on the kidneys.**

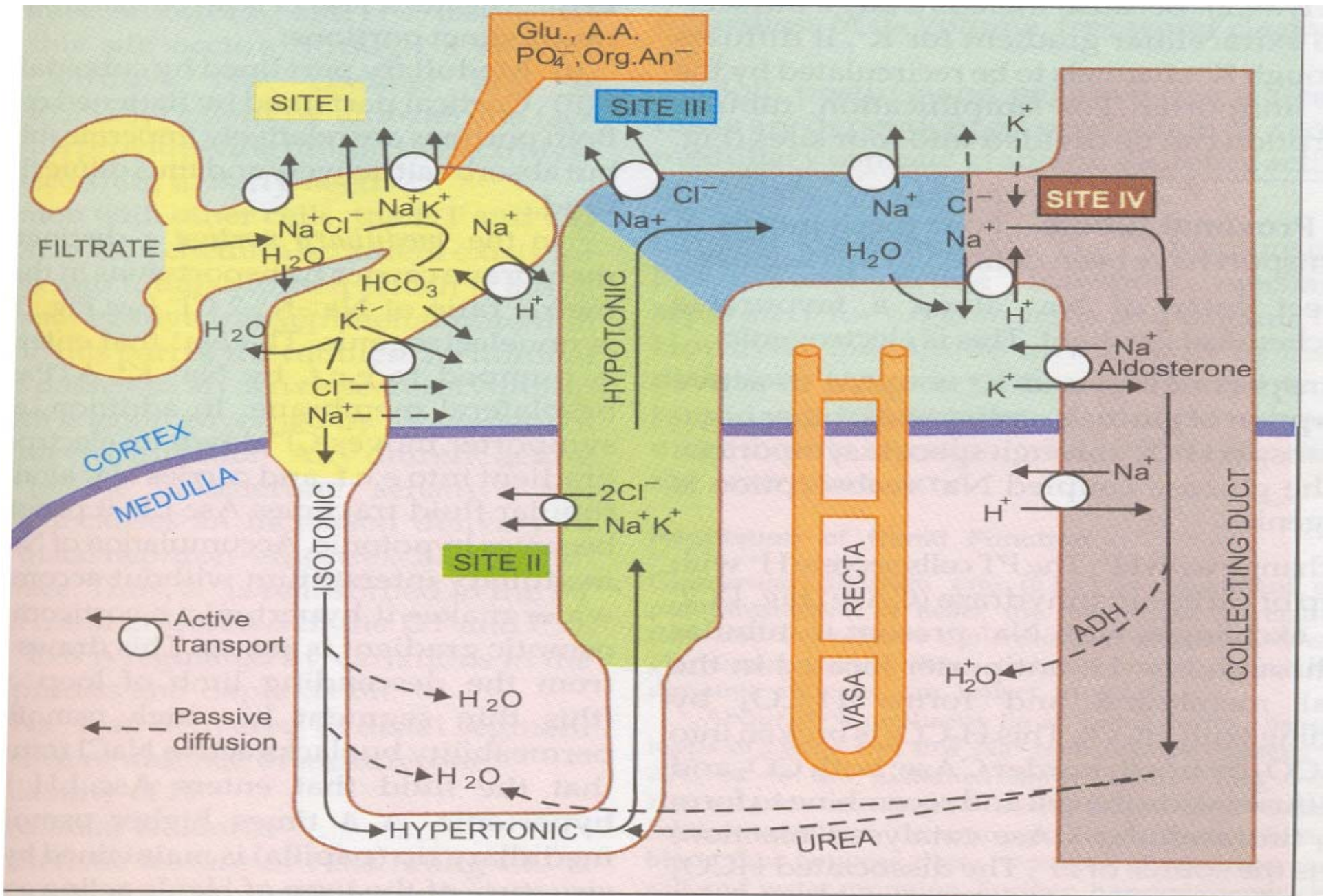
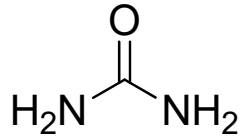


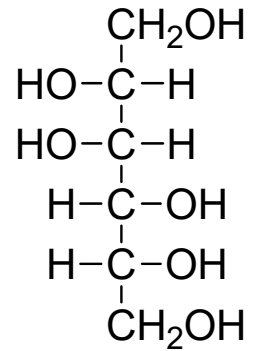
Fig. IX.1: Diagrammatic representation of nephron showing the four sites of solute reabsorption. The thick ascending limb of loop of Henle is impermeable to water; Glu.—Glucose; A.A.—Amino acid; Org. An.—Organic anions.

Site-I diuretics

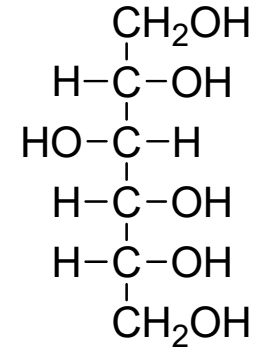
1. Osmotic diuretics



Urea

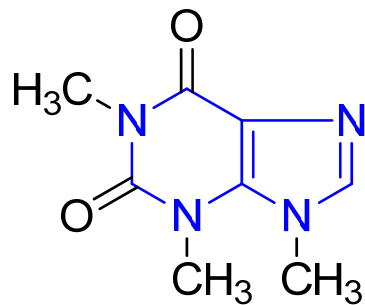


Mannitol

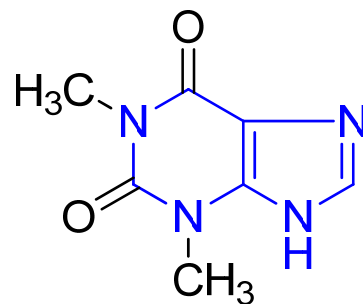


Sorbitol

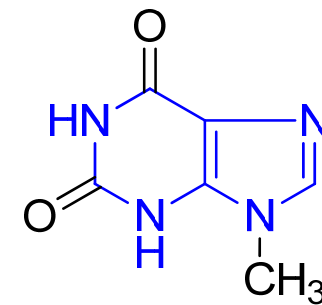
2. Xanthenes



Caffeine

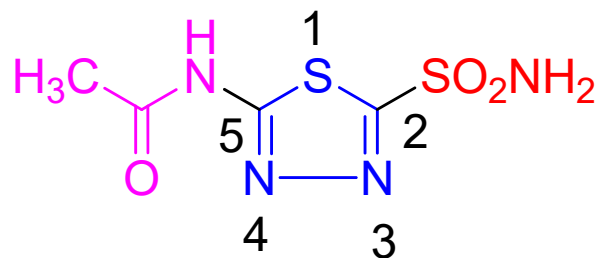


Theophylline



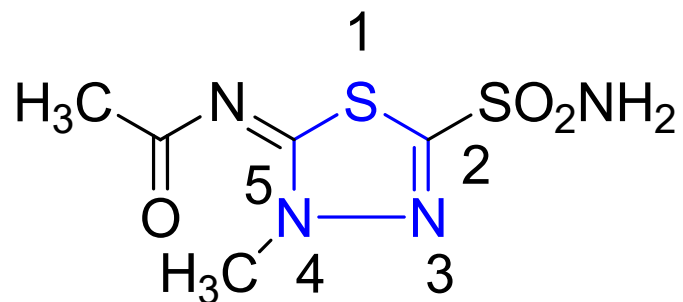
Theobromine

3. Carbonic anhydrase inhibitors



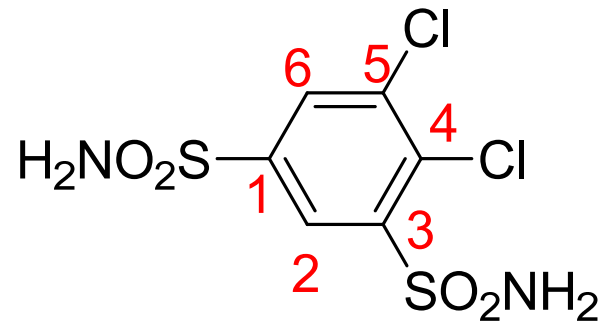
Acetazolamide

IUPAC: 5-acetamido-1,3,4-thiadiazol-2-sulfonamide



Methazolamide

IUPAC: N-(4-methyl-2-sulfamoyl-1,3,4-thiadiazol-5-ylidene) acetamide

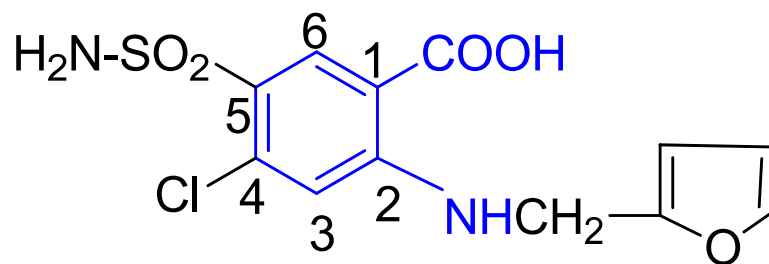


Dichlorphenamide

IUAC: 4,5-dichlorbenzol-1,3-disulfonamide

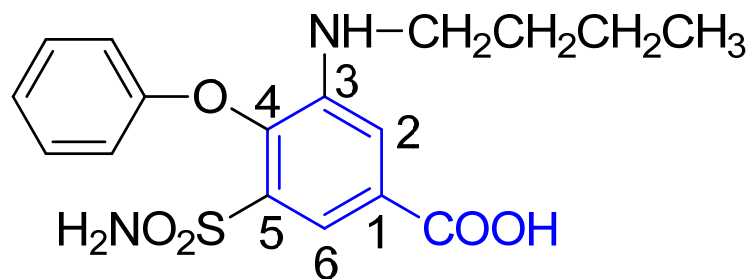
Site-II diuretics /Loop Diuretics/High ceiling diuretic

1. Sulphonamide derivatives



Furosemide

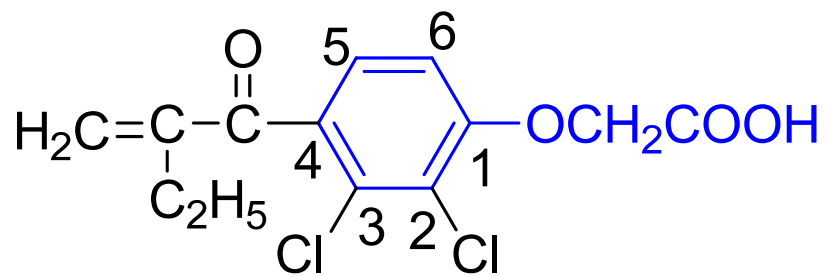
IUPAC: 4-chloro-N-furfuryl-5-sulfamoylanthranilic acid



Bumetanide

IUPAC: 3-butylamino-4-phenoxy-5-sulfamoylbenzoic acid

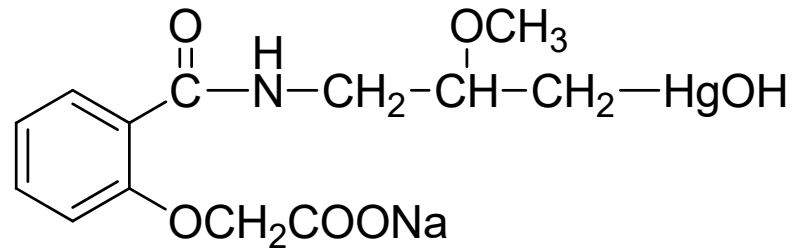
2. Phenoxyacetic acid derivatives



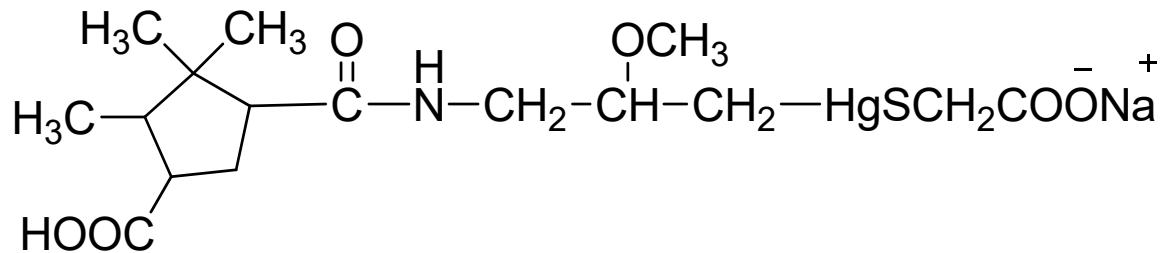
Ethacrynic acid

IUPAC: [2,3-dichloro-4-(2-methylenbutyryl)phenoxy]acetic acid

3. Organomercurials



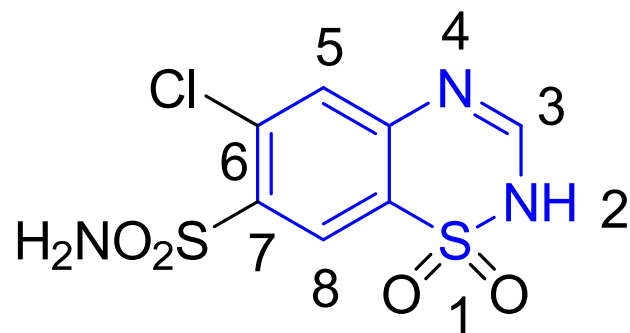
Mersalyl



Mercaptomerin

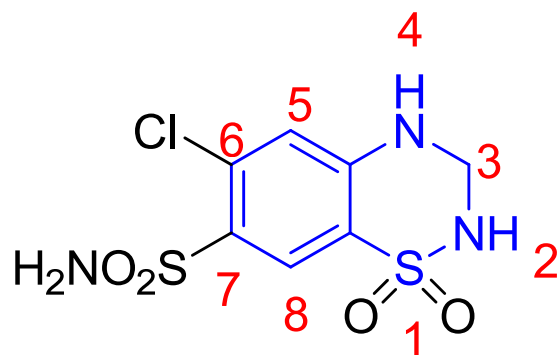
Site-III diuretics

1. Benzothiadiazine derivatives:



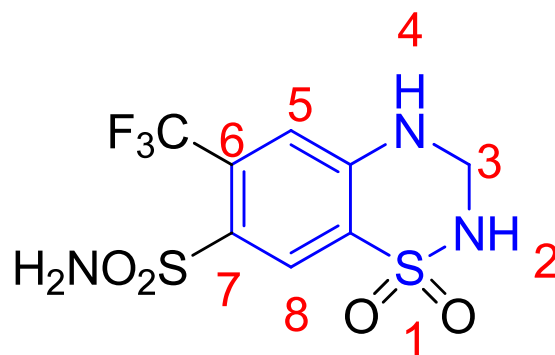
Chlorthiazide

IUPAC: 1,1-dioxide 6-chloro-2H-1,2,4-benzothiadiazin-7-sulfonamide



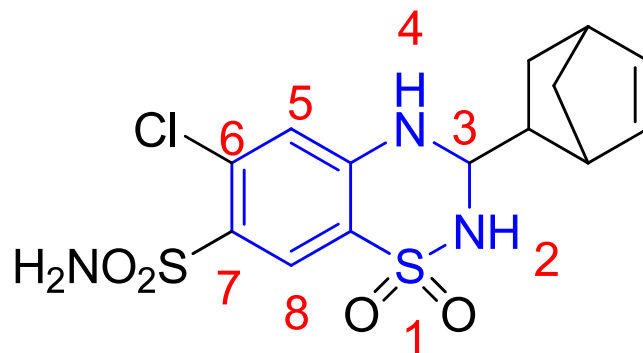
Hydrochlorothiazide

IUPAC: 1,1-dioxide 6-chloro-3,4-dihydro-2H-1,2,4-benzothiadiazin-7-sulfonamide



Hydroflumethiazide

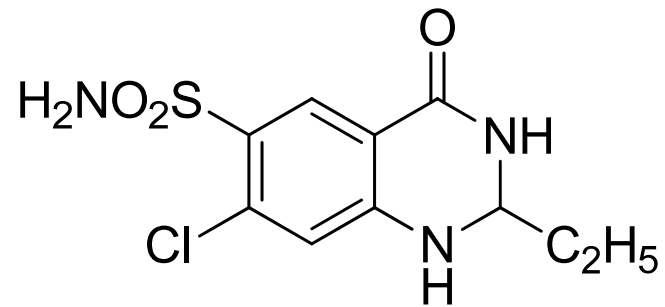
IUPAC: 1,1-dioxide 3,4-dihydro-6-trifluoromethyl-2H-1,2,4-benzothiadiazin-7-sulfonamide



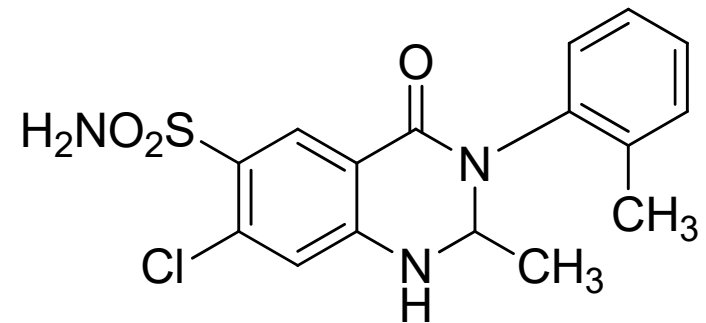
Cyclothiazide

IUPAC: 1,1-dioxide 3,4-dihydro-3-(5-norbornen-2-yl)-6-chloro-2H-1,2,4-benzothiadiazin-7-sulfonamide

2. Quinazoline derivatives:



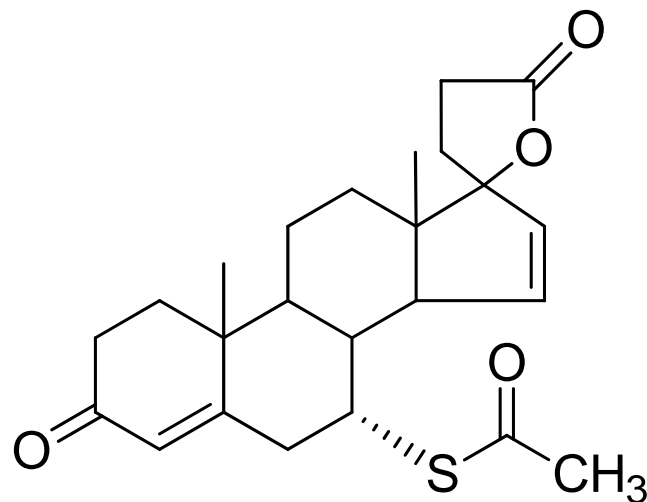
Quinethazone



Metolazone

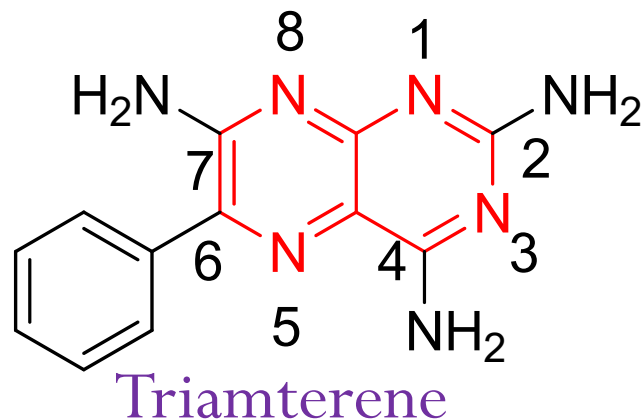
Site-IV diuretics / Potassium sparing diuretics

1. Aldosterone antagonist

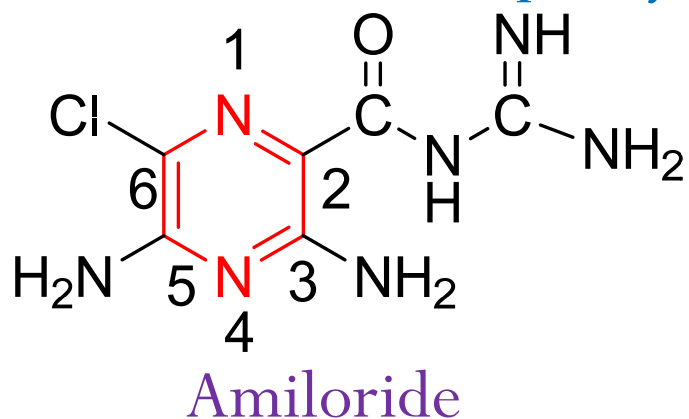


Spironolactone

2. Epithelial Na⁺ channel inhibitors



IUPAC: 2,4,7-triamino-6-phenylpteridine



N-amidino-3,5-diamino-6-chloropiperazinecarboxamide