

Medical treatment of dizziness and nystagmus

**XXVI Bárány
Society Meeting**

Reykjavik 2010



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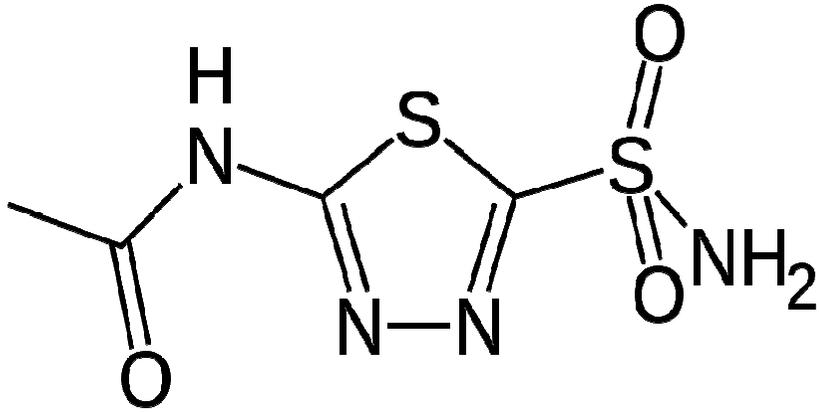
Pharmacotherapy for:

Vestibular syndromes:

- Cogan syndrome
- Episodic ataxia type 2
- Menière's disease
- Motion sickness
- Nausea and vomiting
- Phobic postural vertigo
- Vestibular drop attacks
- Vestibular migraine
- Vestibular neuritis
- Vestibular paroxysmia

Nystagmus syndromes:

- Acquired pendular nystagmus
- Congenital nystagmus
- Downbeat nystagmus
- Periodic alternating nystagmus
- Seesaw nystagmus
- Upbeat nystagmus



Acetazolamide



Class: Carbonic anhydrase inhibitor

Indication: **Episodic ataxia type 2** (no controlled studies)

Dosage: 250 – 1000 mg/day

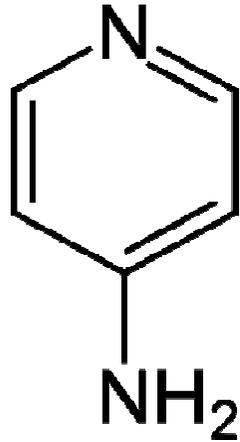
Side effects:

Paresthesia, hearing impairment, metabolic acidosis, hypercalciuria, nephrolithiasis, hematuria, disturbance of hepatic function

Contraindications:

Hyperchloremic acidosis, hypercalciuria, long-term treatment of chronic glaucoma, hypokalemia, obstructive pulmonary disease, severe disturbance of hepatic function (e.g., hepatic coma)

Alternative medication: **4-Aminopyridine**



4-Aminopyridine



Mechanism of action:

Reversible potassium channel blocker

Indications:

- **Episodic ataxia type 2** (open case series, one placebo-controlled trial)
- **Downbeat nystagmus** (2 studies with DBN)
- **Upbeat nystagmus** (single case report)

Dosage: 10 - 15 mg/day (alternatively: sustained release form)

Side effects:

Nausea, vomiting, headache, transient perioral or distal paresthesia

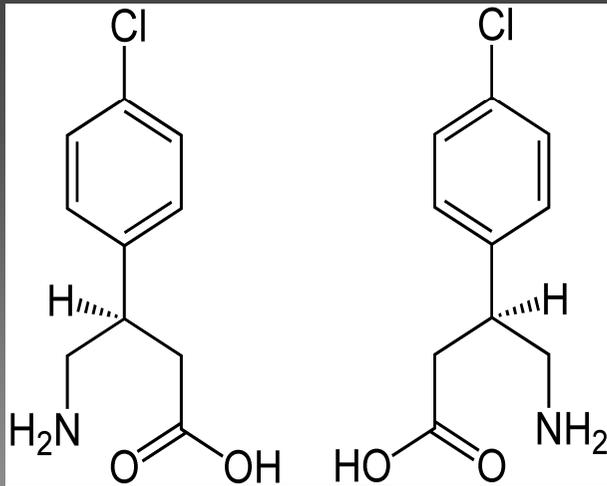
At high doses, rarely epileptic seizures or cardiac arrhythmias progressing to cardiac arrest

Contraindications:

Allergy to aminopyridines, QT-prolongation, cardiac arrhythmias

Alternative medications:

- **Acetazolamide** (for episodic ataxia type 2)
- **Baclofen** (for downbeat/upbeat nystagmus)
- **Clonazepam** (for downbeat nystagmus)
- **Gabapentin** (for downbeat nystagmus)



Baclofen



Mechanism of action: Gamma-aminobutyric acid_B agonist

Class: Muscle relaxant

Indications:

Downbeat nystagmus (double-blind crossover trial in a few patients)

Upbeat nystagmus (open case series)

Periodic alternating nystagmus (open case series)

Dosage: 5 – 10 mg/day

Side effects:

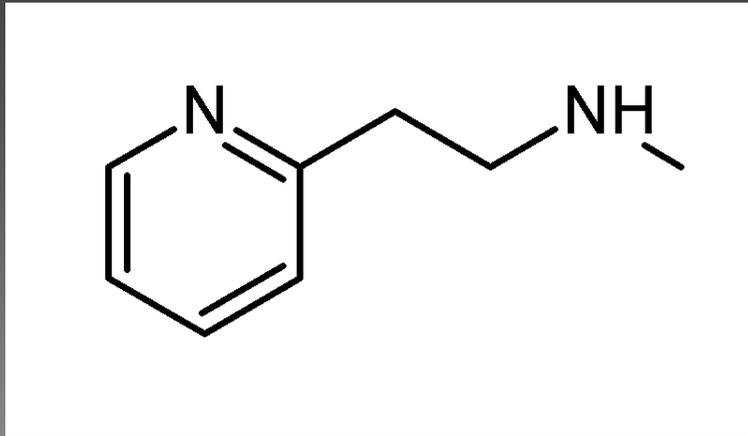
Dizziness, nausea, headache, constipation or diarrhea, vision changes, ataxia, dry mouth. Unlikely - mental/mood changes, seizures, stomach pain, trouble breathing, fainting, painful urination, muscle pain

Contraindications:

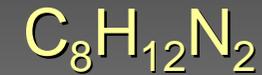
Severe disturbance of hepatic function, constrained kidney function, gastrointestinal ulcers, psychotic conditions, acute intoxication (e.g., with alcohol or sedatives)

Alternative medications:

- **4-Aminopyridine** (for downbeat/upbeat nystagmus)
- **Clonazepam** (for downbeat nystagmus)



Betahistine



Mechanism of action: H₁ receptor agonist and H₃ receptor antagonist

Class: Antihistamine

Indications: **Menière's disease** (open trials)
Vestibular drop attacks (open trials)

Dosage: 144 mg/day (in single cases up to 480 mg/day)

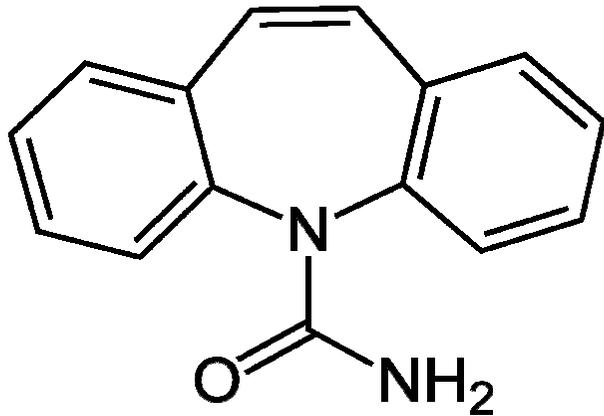
Side effects:

Hypersensitivity reactions, headache, nausea, vomiting, diarrhea, mild vegetative symptoms such as meteorism, dyspepsia, and heartburn

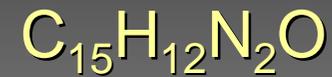
Contraindications: Bronchial asthma, gastrointestinal ulcers

Alternative medications:

- **Intratympanic injections of gentamicin**
- **Intratympanic injections of dexamethasone**



Carbamazepine



Mechanism of action: Sodium channel blocker

Class: Antiepileptic drug

Indications:

- Vestibular paroxysmia (open trial)
- Paroxysmal dysarthria and ataxia in MS (open trial)
- Superior oblique myokymia (case studies, open trials)

Dosage: 200 – 600 mg/day

Side effects:

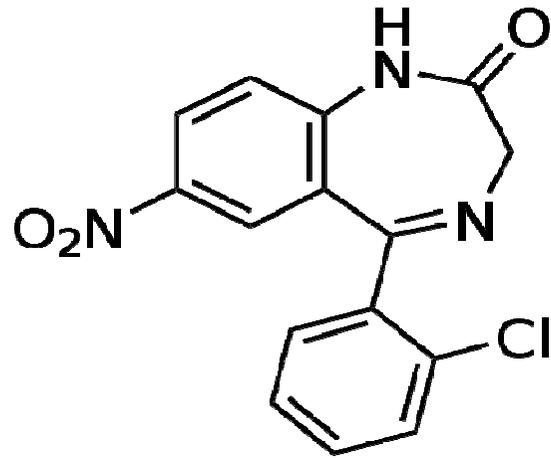
Nausea, vomiting, dizziness, headache, fainting, hair loss, arthralgia, disturbance of hepatic function, atrioventricular block, mental/mood changes, vision changes, nystagmus, hyponatremia, leucopenia, allergic reaction (rash, itching, trouble breathing). Very rarely - serious side effects as chest/abdominal pain, bone marrow depression. Drug interactions, e.g., with anticonvulsive drugs, neuroleptics

Contraindications:

Allergy to carbamazepine, impaired hepatic function, decreased bone marrow function, glaucoma, severe cardiovascular disease, myotonic dystrophy, pregnancy

Alternative medications:

- Oxcarbazepine
- Gabapentin
- Valproic acid
- Phenytoin



Clonazepam



Mechanism of action: Gamma-aminobutyric acid_A agonist

Class: Benzodiazepine

Indication:

Symptomatic short-term treatment of nausea and vomiting in acute vestibular disorders

Dosage: 0.5 mg every 4 to 6 hours

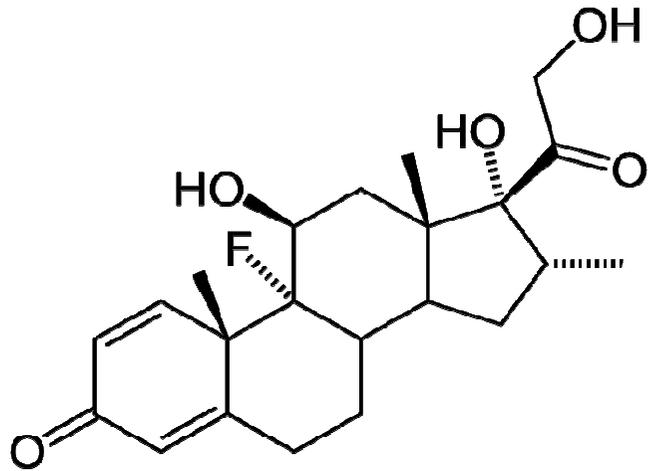
Side effects:

Sedation, drowsiness, tiredness, dizziness, dermal hypersensory reactions, dry mouth, gastrointestinal complaints, impaired vision, uncertainty or gait, after long-time treatment dependency, withdrawal syndrome after abrupt discontinuation
Unlikely – depressive mood, muscle weakness
Drug interactions, e.g., with central effective drugs and alcohol, muscle relaxants, analgetics, anticoagulants, cimetidine, central effective antihypertensives

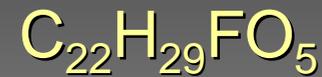
Contraindications: Allergy to benzodiazepines, glaucoma, dependency/acute intoxication of different drugs and alcohol, myasthenia gravis, severe liver damage, severe chronic respiratory insufficiency, sleep-apnea-syndrome, lactation period

Alternative medications:

- Dimenhydrinate
- Meclozine
- other Benzodiazepines (e.g. diazepam)



Dexamethasone



Class: Glucocorticoid

Indication: Menière's disease (prospective, controlled, double-blind study)

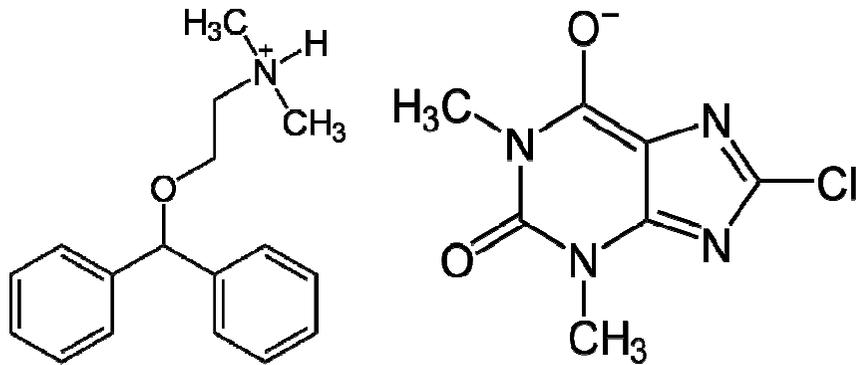
Dosage: Intratympanic weekly injections of 0.5 ml of a 10 mg/ml dexamethasone solution for 1 month

Side effects: Unlikely - systemic effects due to local instillation

Contraindications: Heart failure, immunosuppression, hypothyreosis, diabetes mellitus, liver cirrhosis, pregnancy

Alternative medications:

- Betahistine
- Intratympanic instillations of gentamicin



Dimenhydrinate



Mechanism of action: H₁ receptor antagonist

Class: Antihistamine plus methylxanthine

Indications:

Symptomatic short-term treatment of nausea and vomiting as accompanying complaints in

- Different diseases with acute labyrinthine lesion or lesion of vestibular nerve /nucleus
- Vestibular migraine
- Motion sickness (prevention)

Dosage: 100 – 300 mg/day

Side effects:

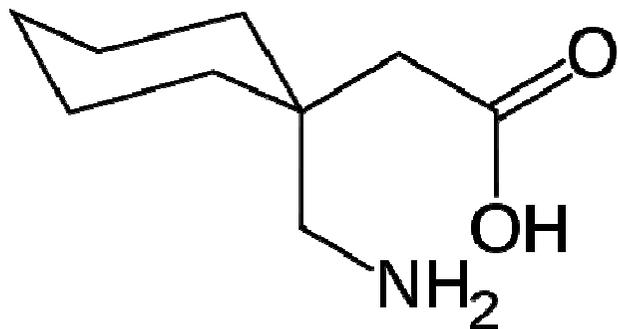
Allergic reactions, muscle pain, dizziness, drowsiness, paradoxical reactions (e.g., sleep disturbances, tremor, excitation), dry mouth, hypokalemia, hypomagnesemia, disturbance of hepatic function, anticholinergic effects, tachycardia, disturbance of micturition, gastrointestinal complaints

Contraindications:

Allergy to antihistaminic drugs, severe asthma, glaucoma, benign prostatic hyperplasia, epilepsy, eclampsia, last weeks of pregnancy. Drug interactions, e.g., with MAO-inhibitors, drugs with anticholinergic effects, drugs with prolongation of QT-interval, aminoglycosid antibiotics. The effect of sedatives is enhanced.

Alternative medications:

- Meclozine
- Scopolamine (motion sickness)
- Benzodiazepines (e.g., clonazepam)



Gabapentin



Mechanism of action: Unknown

Class: Antiepileptic drug

Indications:

- **Downbeat nystagmus** (double-blind crossover trial in a few patients)
- **Acquired pendular nystagmus** (prospective, examiner-blind, crossover study)
- **Various forms of acquired nystagmus** (masked crossover trial)
- **Congenital (juvenile) nystagmus** (randomised, controlled, double-blind study)

Dosage: 600 – 1200 mg/day

Side effects:

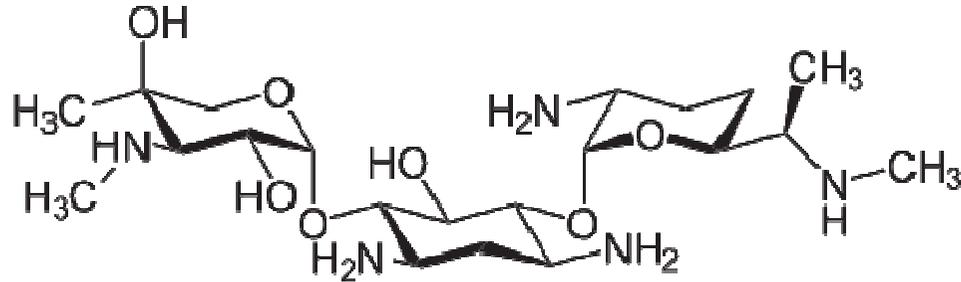
Dizziness, nausea, fatigue, weight gain, dry mouth, constipation, tremor

Unlikely - loss of coordination, mental/mood changes, sore throat/fever/cough, unusual bleeding, chest pain, trouble breathing, stomach pain, hearing loss, irregular/slow heartbeat

Contraindications: Impaired kidney function, caution in children and in the elderly, pregnancy

Alternative medication:

- **Memantine** (for acquired pendular nystagmus, congenital nystagmus, seesaw nystagmus)
- **4-Aminopyridine** (for downbeat nystagmus)
- **Baclofen** (for downbeat nystagmus)
- **Clonazepam** (for downbeat nystagmus, seesaw nystagmus)



Gentamicin



Class: Aminoglycoside antibiotic

Indications:

- **Menière's disease** (prospective uncontrolled study, metaanalysis of 15 studies)
- **Vestibular drop attacks** (open trial)

Dosage:

Intratympanic instillations of 1 ml gentamicin solution (10 – 20 mg/ml) at fixed interims of several weeks, or
Single-shot injections and follow-up

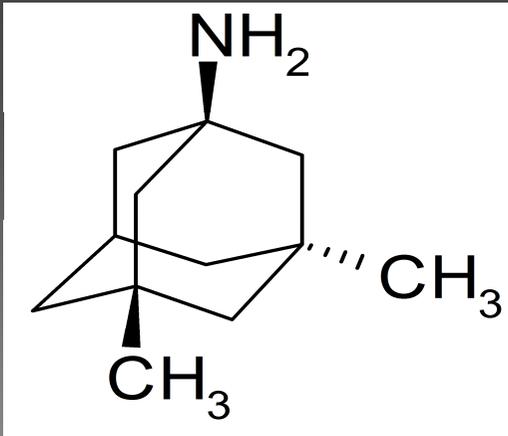
Side effects:

Hearing loss (in at least 20%), vestibular impairment
Unlikely - systemic effects because of local instillation

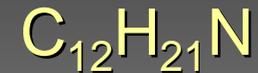
Contraindications: Allergy to gentamicin, kidney insufficiency, pregnancy

Alternative medications:

- **Betahistine**
- **Intratympanic injections of dexamethasone**



Memantine



Mechanism of action: N-methyl-D-aspartate (NMDA) antagonist

Class: Anti-dementia drug

Indications:

- **Acquired pendular nystagmus** (prospective examiner-blind, crossover study)
- **Various forms of acquired nystagmus** (masked crossover trial)
- **Congenital (juvenile) nystagmus** (randomised, controlled, double-blind study)

Dosage: 40 - 60 mg/day (for congenital nystagmus 10 – 40 mg/day)

Side effects:

Headache, high blood pressure, dizziness, drowsiness, mental changes

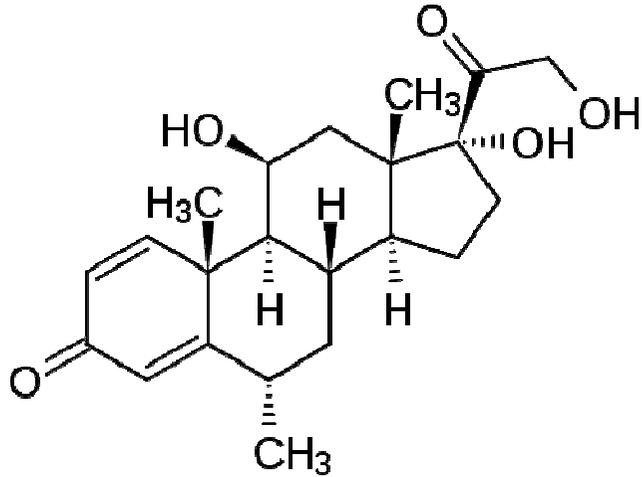
Unlikely - epileptic seizures, hallucinations (esp. in patients with Alzheimer's disease), deep venous thrombosis

Contraindications:

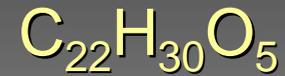
Severe cardiovascular disease, myocardial infarction, epilepsy, severe uncontrolled hypertension, renal tubular acidosis

Alternative medication:

Gabapentin (for acquired pendular nystagmus, congenital nystagmus, seesaw nystagmus)



Methylprednisolone



Class: Glucocorticoid

Indications:

- Acute vestibular neuritis (prospective randomised, double-blind, two-by-two factorial trial)
- Cogan syndrome

Dosage: 100 mg/day, tapered by 20 mg every third day (Cogan syndrome: beginning with 1000 mg/day)

Side effects:

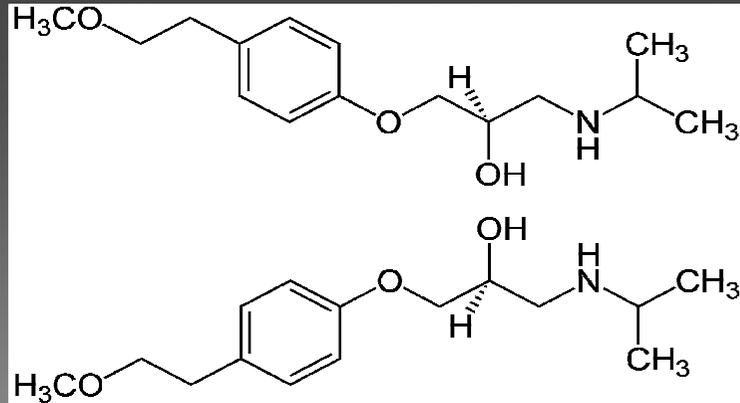
Allergic reactions (rash, itching, swelling, trouble breathing), tiredness, headache, gastrointestinal disorders, dizziness, phlebitis

Contraindications:

Heart failure, impaired immune function, hypothyreosis, diabetes mellitus, liver cirrhosis, pregnancy

Alternative option:

Short-term, high dosed intravenous therapy with methylprednisolone: 500 mg/day for 5 days or 1000 mg/day for 3 days



Metoprolol



Class: Beta-adrenergic receptor blocker

Indication: Vestibular migraine (different non-randomised treatment studies)

Dosage: 50 – 200 mg/day for 3 - 6 months as prophylactic treatment

Side effects:

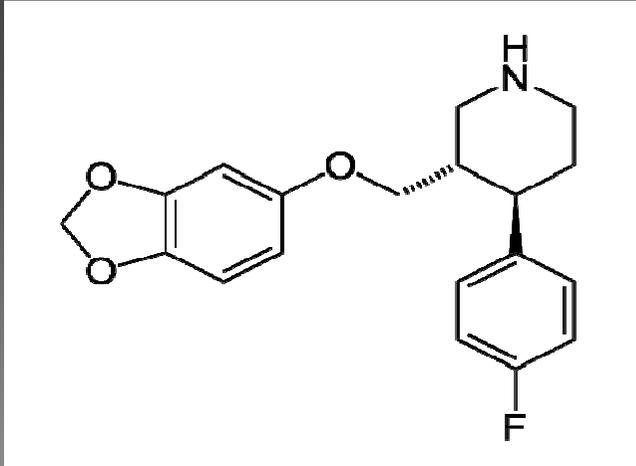
Allergic reactions (rash, itching, swelling, trouble breathing), muscle weakness and pain, tiredness, headache, dizziness, hypotonia, impairment of diabetes, distal paresthesias

Contraindications:

Heart failure (III and IV), atrioventricular block (II and III), sinoatrial block, sick sinus syndrome, bradycardia, severe hypotonia, obstructive pulmonary disease, bronchial asthma, metabolic acidosis, late-state peripheral circulatory disorder, anamnesis of severe allergic reactions, psoriasis, diabetes mellitus with severe fluctuating glucose blood levels; caution at presence or disposition to depression

Alternative medication:

- Topiramate
- Valproic acid
- Tricyclic antidepressants
- Dimenhydrinate/Diphenhydramine (symptomatic treatment for nausea and vomiting)



Paroxetine



Mechanism of action:

Selective serotonin reuptake inhibitor

Class: Antidepressant

Indication: Phobic postural vertigo (no controlled studies)

Dosage: 20 - 40 mg/day over 3 – 6 months

Side effects:

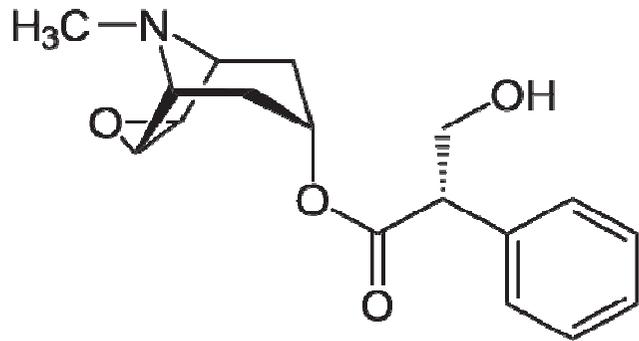
Dizziness, nausea, paresthesias, restlessness, somnolence, headache, thrombocytopenia, bleeding disorder, sexual dysfunctions, seizures, extrapyramidal symptoms, tremor, constipation, hepatitis, allergic reactions (rash, itching, swelling), hyponatremia

Contraindications:

Epilepsy, record of manic episodes, cardiovascular disease, glaucoma, history of bleedings, treatment with anticoagulants or drugs with effects on function of thrombocytes, treatment with neuroleptics, MAO-inhibitors; pregnancy

Alternative medications:

- Other SSRI (e.g., Fluvoxamine/Escitalopram)
- Tricyclic/tetracyclic antidepressants



Scopolamine



Mechanism of action: Muscarine receptor antagonist

Class: Antiemetic drug

Indication:

Prophylactic treatment of nausea and vomiting in motion sickness

Dosage: 0,5 mg as transdermic application 4 – 6 hours before start of journey

Side effects:

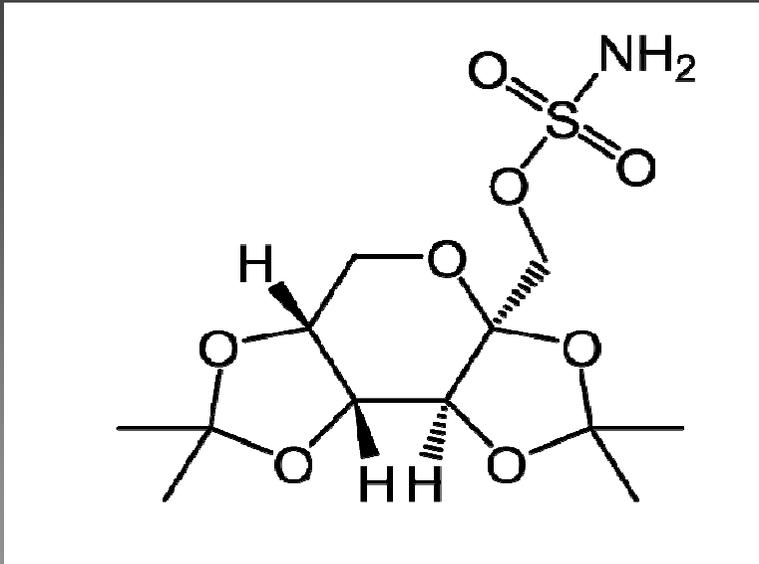
Increased intraocular pressure, dry mouth, dizziness, blurred vision, impaired reaction time and concentration, sedation, disturbance of micturition, tachycardia

Contraindications:

Glaucoma, voiding dysfunction, stenosis of gastrointestinal tract, tachyarrhythmia, acute pulmonary edema, megacolon, severe cerebrovascular disease, pregnancy

Alternative medications:

- Dimenhydrinate/Diphenhydramine
- Meclozine
- Benzodiazepines (e.g., clonazepam)



Topiramate



Class: Antiepileptic drug

Indication: Vestibular migraine (few non-randomised treatment studies)

Dosage: 50 – 100 mg/day for 3 - 6 months as prophylactic treatment

Side effects:

Dizziness, fatigue, drowsiness, paresthesias, nausea, loss of appetite, diarrhea, reduced reaction time and concentration, mood disorder, dry mouth, blurred vision, glaucoma. Drug interactions, e.g., with acetylsalicylic acid, nonsteroidal anti-inflammatory drugs

Contraindications:

Hypercalciuria, impaired hepatic or kidney function, nephrolithiasis

Alternative medications:

- Metoprolol
- Valproic acid
- Tricyclic antidepressants

