

# Bullet Point Nursing

## Endocrine pharmacology

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## Endocrine pathophysiology review

- Growth Hormone (GH): Stimulates growth, cell reproduction, and regeneration
  - ↓ GH: Dwarfism or short stature in children
  - ↑ GH: Acromegaly (adults), Gigantism (children)
- Antidiuretic Hormone (ADH): Increases water reabsorption in the renal collecting ducts
  - ↓ ADH: Diabetes insipidus (polyuria, polydipsia, dilute urine)
  - ↑ ADH: SIADH (syndrome of inappropriate ADH secretion → hyponatremia, water retention)
- Adrenocorticotrophic Hormone (ACTH): Stimulates cortisol production by the adrenal cortex
  - ↓ ACTH: Addison's disease (fatigue, hypotension, hyperpigmentation)
  - ↑ ACTH: Cushing's disease (moon face, central obesity, muscle wasting)
- Thyroxine (T4) / Triiodothyronine (T3): Regulate metabolism, thermogenesis, and development
  - ↓ T3/T4: Hypothyroidism (fatigue, weight gain, cold intolerance)
  - ↑ T3/T4: Hyperthyroidism (weight loss, heat intolerance, tachycardia)
- Serum Calcium Regulation:
  - ↓ Parathyroid Hormone (PTH):
    - Increases serum calcium by:
      - Stimulating bone resorption
      - Enhancing renal calcium reabsorption
      - Activating vitamin D (↑ intestinal calcium absorption)
  - ↑ Calcitonin:
    - Decreases serum calcium by:
      - Inhibiting osteoclasts (↓ bone resorption)
      - Increasing renal calcium excretion

## Drug class: Growth Hormone

- Drug:
  - Somatotropin
- MOA: Stimulates growth of all tissue
- Indications: Short stature, growth failure
- SE/AE: Hyperglycemia
- Parenterally only

## Drug class: Somatostatin analog

- Drug:
  - Octreotide
- MOA: Inhibits the release of growth hormone

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- Indications: Acromegaly, diarrhea
- SE/AE: GI issues
- Parenterally only
- Pasireotide is another drug in this class used for acromegaly and Cushing disease

## Drug class: Antidiuretic hormone

- Drug:
  - Vasopressin
- MOA: Reabsorbs water from filtrate, vasoconstriction
- Indication: Shock and cardiac arrest
- SE/AE: Hypertension, arrhythmias, water retention
- Parenterally only
- Another medication in this class is desmopressin (DDAVP)
  - This is used for diabetes insipidus, nocturnal enuresis, von Willebrand disease, and hemophilia A
  - Does not cause vasoconstriction like vasopressin
  - SE/AE: Hyponatremia, fluid overload, and headache
  - Available PO and parenterally

## Drug class: Glucocorticoid / Corticosteroid

- Drugs:
  - Hydrocortisone
  - Prednisone
  - Methylprednisolone
  - Dexamethasone
  - Betamethasone
- MOA: Suppresses inflammation, immune response, and adrenal function
- Indications: Adrenocortical insufficiency, Addisons, inflammation, immune suppression, nausea
  - Specific conditions include gout, asthma, covid-19, IBD, allergies, cancers, gout
- SE/AE: Immunosuppression, hyperglycemia, hypertension, osteoporosis, mood swings, weight gain, sodium and fluid retention, PUD, abnormal fat deposits (Cushingoid appearance)
- Preferential to select steroids with a local effect versus a systemic effect (intranasal versus PO)
  - Available topically, intranasal, inhaled, orally, and via injection
- Steroids must always be tapered when discontinued
- Increased risk of adverse effects if given with NSAIDS
- Avoided in patients with an active infection

*Cosyntropin is used for diagnosing adrenocortical insufficiency due to adrenal vs pituitary causes*

## Drug name: Ketoconazole

- MOA: Antifungal, reduces cortisol and androgen production
- Indication: Fungal infections
- Off-label indication: Cushing syndrome

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- SE/AE: Hepatotoxicity, GI issues
- Black box warning: Hepatotoxicity, multiple interactions can lead to QT prolongation

## **Drug name: Levothyroxine (Synthroid)**

- MOA: Synthetic form of thyroxine
- Indication: Hypothyroidism
- Titrated up and tapered down based on labs (TSH)
  - Dosed in small increments from 12.5mcg to 300mcg
  - Additional labs monitored include T3 and T4
- Onset is 3-5 days, peak effects take 4-6 weeks
- Therapy is generally lifelong
- Should be taken in the morning and on an empty stomach
- Black Box warning: Not to be used for weight loss
- Monitor for over or under treatment (s/s of hypo and hyperthyroidism)

## **Drug class: Thioamide**

- Drugs:
  - Methimazole
  - Propylthiouracil
- MOA: Blocking synthesis of thyroid hormones
- Indication: Hyperthyroidism (Graves' disease and thyroid storm)
- Black Box warning: PTU has increased risk of hepatotoxicity
- Methimazole cannot be taken in the first trimester of pregnancy

*Potassium Iodide (Lugol's solutions) or sodium iodide is used to suppress the thyroid prior to surgery and to treat thyroid storm*

*Radioactive Iodide (I-131) is used to treat hyperthyroidism and thyroid cancer*

## **Drug name: Calcitriol (Vitamin D analogue)**

- MOA: Increases calcium reabsorption by the kidneys, absorption by the intestines, and secretion of calcium from the bones to the bloodstream
- Indications: Parathyroid disorders, hypocalcemia
- SE/AE: Related to excess calcium

## **Drug name: Calcitonin**

- MOA: Similar to human calcitonin
- Indications: Hypercalcemia, Paget disease, osteoporosis
- SE/AE: Hypocalcemia
  - This is salmon derived product. Caution in those with allergies
- Parenterally only (IN, SQ, IM)

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## References

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