

# Bullet Point Nursing

## Diabetes Pharmacology

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### Diabetes pathophysiology and nursing review

- Type 1 diabetes is an autoimmune disorder where the body's immune system attacks and destroys the insulin-producing beta cells in the pancreas
- Type 2 diabetes is primarily a result of insulin resistance, where the body's cells do not respond effectively to insulin
- Hypoglycemia is treated with oral glucose, IV dextrose, or IM glucagon
- The body releases insulin in response to a high serum glucose level and glucagon when low
- Treatment of DM is monitored via blood glucose and A1C levels
- DKA and HHS are treated with insulin and fluids
- Complications include diabetic retinopathy, nephropathy, neuropathy, atherosclerosis, PVD
- Educate patients on lifestyle modifications

### Drug class: Insulin

Rapid	Lispro, Aspart	15-30 min	3-5 hrs	Used for meal coverage
Short	Regular (Humalin R)	0.5-1 hr	5-10 hrs	IV infusion
Intermediate	NPH (Humalin N)	1-2 hr	12-24 hrs	AKA Isophene
Long	Glargine, Detemir	1-4 hr	24 hrs	Basal coverage

- MOA: Insulin stimulates cellular uptake of glucose and promotes conversion of glucose into glycogen
- Indications: Diabetes
  - Also used with glucose to treat acute hyperkalemia
- Only given parenterally
- SE/AE: Hypoglycemia, hypokalemia
- Multiple insulins may be used to provide for basal coverage in addition to prandial coverage
- When drawing NPH with a short acting, draw up the short acting insulin first
- Insulin is stored at refrigerated temperature
  - Once in use it can be used for thirty days and can be stored at room temperature
- Goal is a hemoglobin A1C of less than 7%
- If the insulin causes hypoglycemia treat with oral glucose or IV glucose / IM glucagon
- Educate patient and family to rotate injection sites to prevent lipodystrophy
- Advise patient to wear a medical alert bracelet
- Teach signs and symptoms of hypoglycemia and hyperglycemia
- Sliding scale is sometimes used to calculate dose for insulin
  - This prescribes a specific dose based upon the blood glucose level
- Assess blood glucose level before and after insulin administration
  - Normal is 70-110
- IV insulin infusion is considered high risk and is usually only given in the ED/ICU

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## Drug class: Biguanides

- Drug:
  - Metformin (Glucophage)
- MOA: Blocks glucose production in the liver and increases insulin sensitivity
- Indications: Diabetes
- Off-label use includes PCOS
- Black Box warning: Can cause lactic acidosis
- SE/AE: GI upset, worse upon starting treatment
- Alcohol should be avoided
- First line agent for type two diabetes

## Drug class: Glucagon-like peptide-1 receptor agonists (GLP-1 agonists)

- Drugs:
  - Exentide (Byetta)
  - Liraglutide (Victoza)
  - Dulaglutide (Trulicity)
  - Semaglutide (Ozempic)
- MOA: Increases the effects of incretin which stimulates release of insulin and blocks release of glucagon
- Indications: Diabetes
  - May also be used for weight loss
- Black Box warning: Thyroid C-cell cancer risk
- SE/AE: GI effects, increased HR
- Subcutaneous only
- Often used as a second line agent following metformin

## Drug class: Sulfonylureas

- Drug:
  - Glipizide (Glucotrol)
  - Glimepiride
- MOA: Stimulates the release of insulin
- Indications: Diabetes
- SE/AE: Hypoglycemia, weight gain
- Caution for a disulfiram like reaction when combined with alcohol

## Drug class: Meglitinides

- Drug:
  - Repaglinide
- MOA: Stimulate the release of insulin
- Indications: Diabetes
- SE/AE: Hypoglycemia
  - Should be followed by a meal to avoid this

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## **Drug class: Thiazolidinediones**

- Drugs:
  - Rosiglitazone (Avandia)
  - Pioglitazone (Actos)
- MOA: Increases insulin sensitivity
- Indications: Diabetes
- SE/AE: Weight gain
- Black Box warning: Can cause or exacerbate heart failure
- Contraindicated in pregnancy, heart failure, high risk for fractures, and acute liver failure

## **Drug class: Dipeptidyl peptidase-4 inhibitors (DPP-4 inhibitors)**

- Drugs:
  - Linagliptin (Tradjenta)
  - Sitagliptin (Januvia)
- MOA: Block the breakdown of incretin, which stimulates release of insulin and blocks release of glucagon
- Indications: Diabetes

## **Drug class: Sodium-glucose co-transporter 2 inhibitors (SGLT-2 inhibitors)**

- Drugs:
  - Dapagliflozin (Farxiga)
  - Empagliflozin (Jardiance)
- MOA: Promote urinary glucose excretion; it also reduces cardiac preload and afterload
- Indications: Diabetes, chronic kidney disease, and heart failure
- SE/AE: UTI in females and weight loss

## **Drug class: Alpha glucosidase inhibitors**

- Drug:
  - Acarbose
- MOA: Slows the digestion of carbohydrates
- Indications: Diabetes
- SE/AE: GI effects
- Take at the start of the meal

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## References

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