

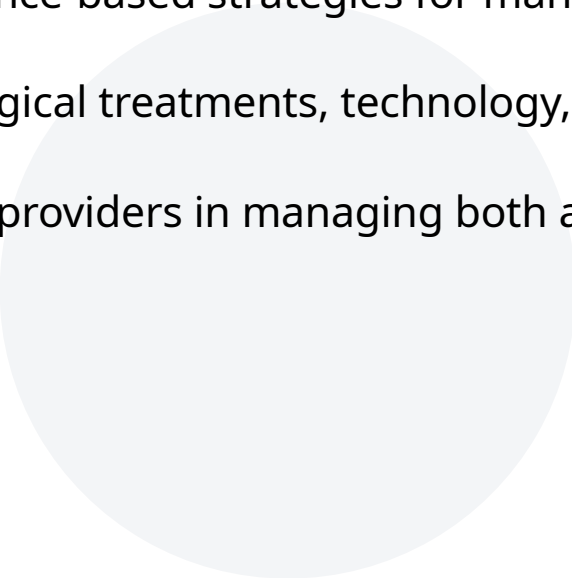
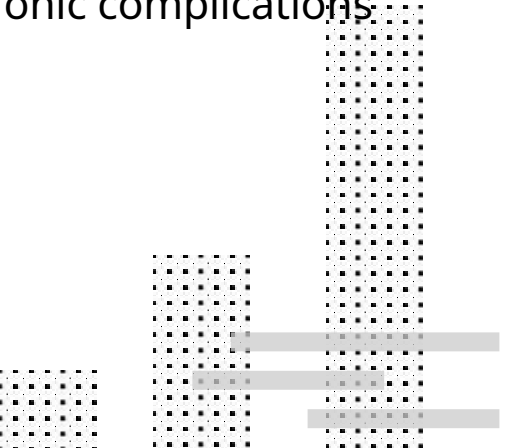




# Introduction



## Overview:

- Key focus on evidence-based strategies for managing diabetes (Type 1 and Type 2)
  - Latest pharmacological treatments, technology, and best practices
  - Role of healthcare providers in managing both acute and chronic complications
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# The what, how, when...

## Overview:

- A chronic condition that affects the way the body processes blood sugar (glucose)
- Insulin : A hormone that helps cells absorb glucose from the bloodstream for energy
- Type 1 Diabetes: Autoimmune condition, often diagnosed in children and young adults, requiring lifelong insulin therapy
- Type 2 Diabetes: Primarily lifestyle-related, often preventable, and may be controlled with medication, diet, and exercise
- Gestational Diabetes: Occurs during pregnancy and increases the risk of developing Type 2 diabetes later in life

# Diagnosis & Monitoring

Diagnostic Criteria (ADA Guidelines 2024):

- Fasting Plasma Glucose (FPG):  $\geq 126$  mg/dL (7.0 mmol/L)
- Oral Glucose Tolerance Test (OGTT):  $\geq 200$  mg/dL (11.1 mmol/L) at 2 hours
- Hemoglobin A1c:  $\geq 6.5\%$  (48 mmol/mol)
- Random Plasma Glucose:  $\geq 200$  mg/dL (11.1 mmol/L) with symptoms of hyperglycemia

# The what, how, when...

## Type 1 Diabetes:

- An autoimmune disorder in which the immune system mistakenly attacks and destroys the insulin-producing beta cells in the pancreas. This leads to absolute insulin deficiency, meaning the body can no longer produce insulin.
- Since the body cannot produce its own insulin, lifelong insulin therapy is essential. Patients must receive exogenous insulin through injections or insulin pumps to regulate blood glucose levels.
- Without insulin, glucose cannot enter cells for energy, leading to elevated blood glucose levels (hyperglycemia) and a risk of long-term complications such as diabetic ketoacidosis (DKA).

# The what, how, when...

## Type 2 Diabetes:

- In Type 2 diabetes, the body becomes resistant to the effects of insulin (insulin resistance), and the pancreas does not secrete enough insulin to overcome this resistance. Initially, the pancreas tries to compensate by producing more insulin, but over time it can't keep up with the body's demands.
- Early management includes lifestyle changes and medications like metformin, SGLT2 inhibitors, and GLP-1 receptor agonists. Later stages may require insulin therapy, either as an adjunct or as the main form of treatment.

# The what, how, when...

## Insulin Dynamics:

- **Insulin Secretion:** Insulin is a hormone produced by the pancreas that helps regulate blood sugar by allowing glucose to enter cells for energy.
- It facilitates glucose uptake into muscle, liver, and fat cells, helping to lower blood glucose levels. Insulin also prevents the liver from producing too much glucose (gluconeogenesis) and helps store glucose in the form of glycogen.
- In Type 2 diabetes, insulin resistance occurs when muscle, liver, and fat cells no longer respond to insulin effectively. This results in higher levels of circulating glucose, and over time, the pancreas struggles to produce enough insulin to compensate for the resistance.

# INSULIN

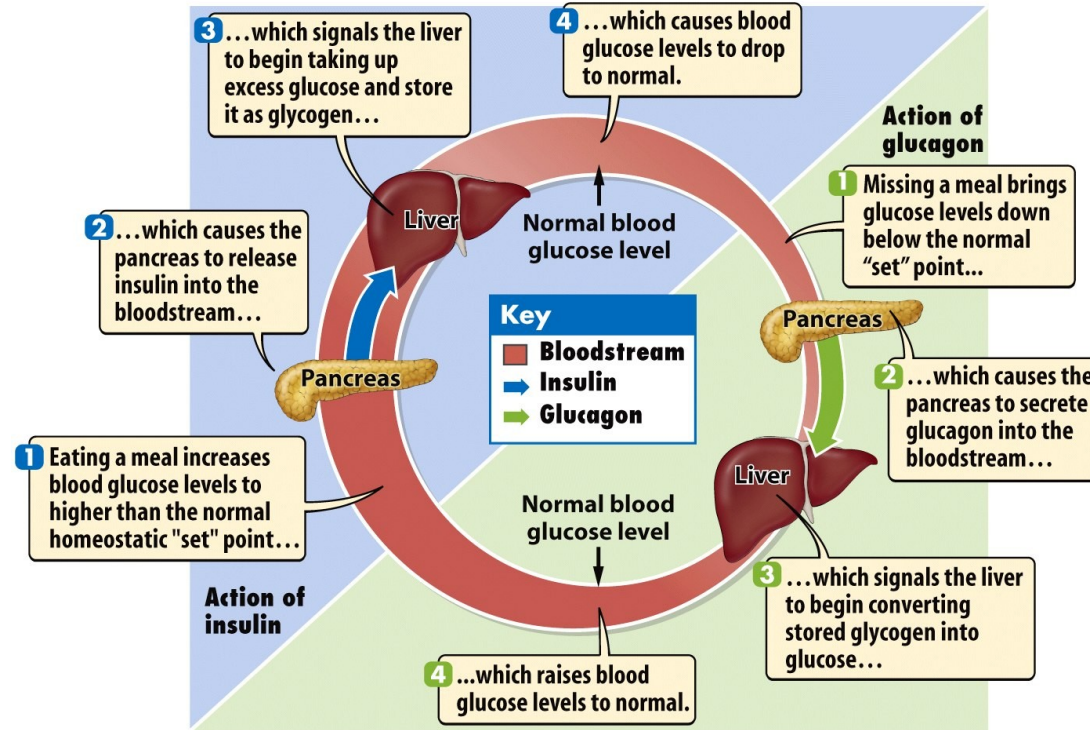


Figure 24-4 Discover Biology 3/e  
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# Pharmacologic Management of Type 1 Diabetes

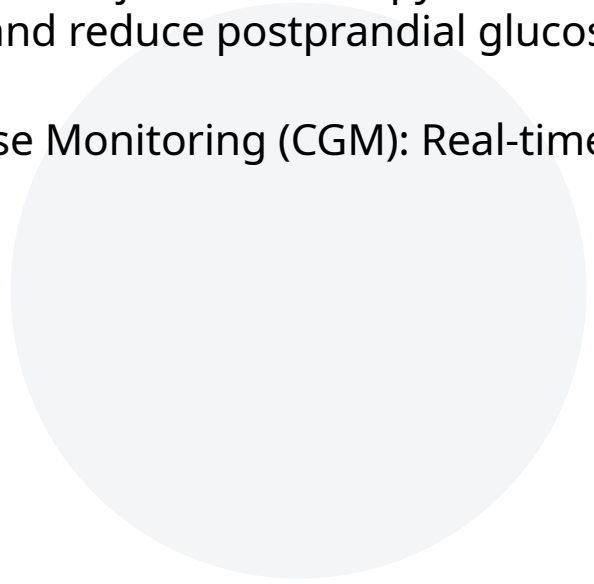
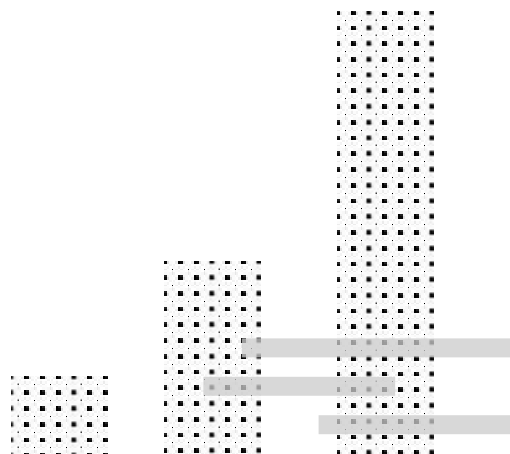
## Insulin Therapy:

- Rapid-acting (e.g., Lispro, Aspart)
- Short-acting (Regular insulin)
- Intermediate-acting (NPH insulin)
- Long-acting (e.g., Glargine, Detemir)
- Ultra-long-acting (e.g., Degludec)
  - Basal-bolus regimen for most patients
  - Continuous subcutaneous insulin infusion (insulin pump therapy)



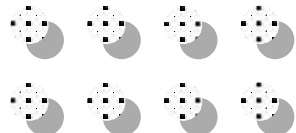
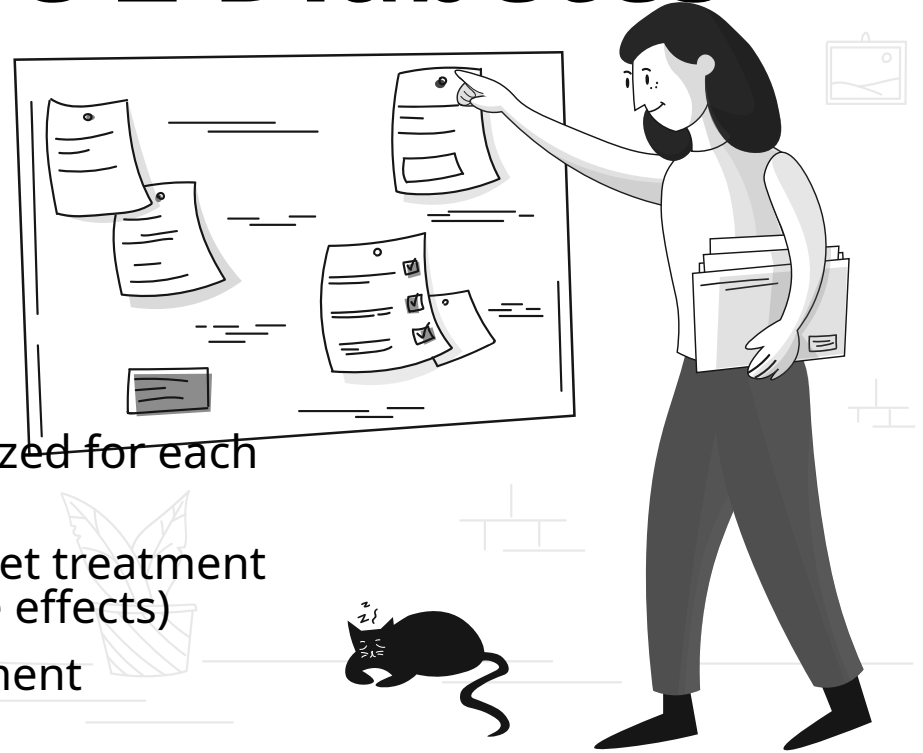
# **Pharmacologic Management of Type 1 Diabetes**

## Adjunct Therapies:

- Pramlintide: Used for adjunctive therapy to insulin for Type 1 Diabetes to slow gastric emptying and reduce postprandial glucose
  - Continuous Glucose Monitoring (CGM): Real-time glucose tracking for better glycemic control
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# Managing Type 2 Diabetes

- Diet:
- Physical Activity:
- Weight Management:
- Goal Setting:
  - A1c target generally  $<7.0\%$  (individualized for each patient)
  - Use of patient-reported outcomes to set treatment goals (quality of life, convenience, side effects)
  - Continuous monitoring and reassessment
- Medication



# Pharmacologic Management of **Type 2** Diabetes

For Type 2 Diabetes:

- Oral Medications: Metformin (first-line), SGLT2 inhibitors, GLP-1 receptor agonists, etc.
- Insulin: For advanced cases, insulin therapy may be needed
- Other Injectables: GLP-1 agonists, which help control blood sugar and aid weight loss

# Pharmacologic Management of **Type 2** Diabetes

## First-Line Treatments:

- Metformin: Effective, weight-neutral, and cardiovascular benefits.
- SGLT2 Inhibitors: Help with renal and cardiovascular health, weight loss.
- GLP-1 Agonists: Promote weight loss and blood sugar control.

## Second-Line Treatments:

- Sulfonylureas: Stimulate insulin release, risk of hypoglycemia.
- Thiazolidinediones: Improve insulin sensitivity, can cause weight gain.
- Insulin: For advanced cases or poorly controlled diabetes.

## Combination Therapy:

- Combining medications (e.g., Metformin + SGLT2 inhibitors) for better control.

# Pharmacologic Management of **Type 2** Diabetes

## Meal Planning:

- Plan meals with balanced carbs, protein, and healthy fats
- Use smaller, more frequent meals to help maintain steady blood sugar levels

## Stay Active:

- Aim for 30 minutes of exercise most days; include strength training

## Stress Management:

- Engage in relaxation techniques such as yoga, deep breathing, and meditation

## Stay Consistent:

- Regular testing, medication, and exercise routines

# Pharmacologic Management of **Type 2** Diabetes

## Stay Active:

- **Aerobic Exercise:** Aim for at least 150 minutes per week of moderate-intensity aerobic exercise (e.g., brisk walking, cycling, swimming) spread across at least 3 days per week, with no more than 2 consecutive days without exercise. This translates to about 30 minutes a day, 5 days a week.
- **Resistance Training:** In addition to aerobic exercise, include 2-3 sessions per week of resistance training (e.g., weightlifting, bodyweight exercises, resistance bands).
- **Flexibility and Balance Training:** especially for older adults or those with diabetic neuropathy, to reduce the risk of falls and improve mobility.

# Pharmacologic Management of **Type 2** Diabetes

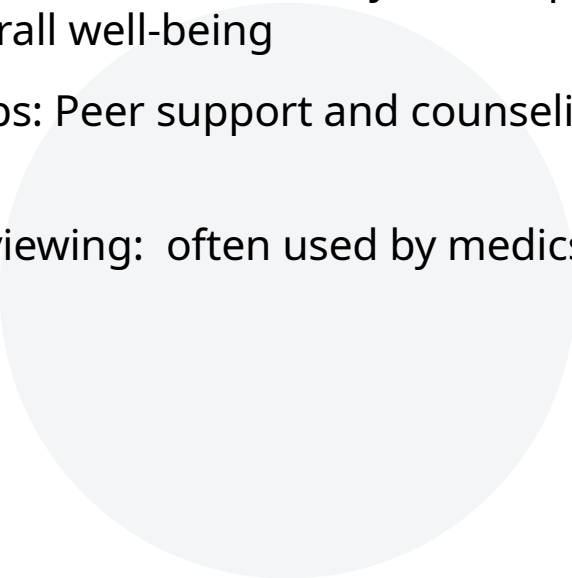
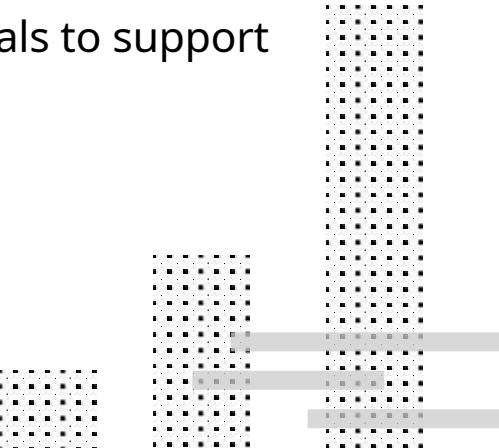
Stay Active **caution:**(hypo/hyper- glycemia symptoms)

- Over-exercising increases the risk of hypoglycemia,
- Intense and prolonged exercise increases cortisol levels, the body's stress hormone. Chronic high cortisol can actually worsen insulin resistance over time, especially in those already managing Type 2 diabetes.
- DKA/ EUGLYCEMIC DKA





# Psychological Support

- Emotional and Mental Health:
    - Diabetes can cause stress, anxiety, and depression. Managing mental health is crucial for overall well-being
    - Support Groups: Peer support and counseling services can help with coping strategies
  - Motivational Interviewing: often used by medical professionals to support behavior change
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# Management of Diabetic Complications

- Cardiovascular Disease: Early screening for heart disease (lipid profile, blood pressure, ECG, etc.) & use of GLP-1 agonists and SGLT2 inhibitors
- Chronic Kidney Disease (CKD): Screening for kidney damage (urinary albumin-to-creatinine ratio), use of SGLT2 inhibitors to slow progression of diabetic nephropathy
- Neuropathy: Regular foot exams for neuropathy- ulcers n amputation
- Retinopathy: Annual eye exams to detect diabetic retinopathy and prevent blindness

# Management of Diabetic Complications

## Weight in Diabetes

- **Diet and Exercise:** A balanced diet with controlled carbohydrate intake and regular exercise is crucial for preventing weight gain. Keto-diet.
- **Medication Adjustments:** If weight gain is a significant concern, medications such as GLP-1 receptor agonists (e.g., semaglutide) or SGLT2 inhibitors (e.g., empagliflozin) may be considered.
- **Personalized Treatment:** your providers should tailor diabetes treatment plans to minimize the risk of weight gain while maintaining good blood sugar control.

**Yes Mom, I checked my sugar!**

**The End.  
Question**

**?**

**DID YOU...?**

