Diabetes

PATHOPHYSIOLOGY

Glucose pathway: GI → blood → (with insulin) tissue

It is important to learn the difference between:

- effects of chronic hyperglycemia, vs
- effects of glucose & insulin on tissues

High blood glucose levels (hyperglycemia)

- Usually occurs because glucose cannot be pushed into tissue – due to:
  - Insulin resistance, or
  - Lack of insulin

Insulin →

Insulin's Effects on tissues

- Insulin is anabolic.
- Directs glucose from blood to tissue
- Crucial for Krebs cycle, ketone metabolism, and fat synthesis/storage.

Special Theory

- After body's fat stores are full, insulin resistance occurs.
- Threshold for amount of body fat needed prior to developing hyperglycemia probably varies widely based on genetics.
- For some, pancreatic hyperplasia will be able to compensate and control glucose blood levels. These patients will frequently develop hypoglycemia after bariatric surgery.

Complications

- Lack of effective insulin (especially during catabolic states such as sepsis) → DKA
- Insulin therapy → further weight gain → worse insulin resistance

Complications

- Vasculopathy – leads to:
  - Neuropathy
  - Nephropathy
  - Retinopathy
  - Gastroparesis
  - Coronary Artery Disease
  - … probably more
- HONK – Hyperosmolar Hyperglycemic non-ketotic Coma
- Results in high a1c

Treatment Philosophy

- Type 2 DM
  - Treatment strategies primarily focus on controlling blood glucose levels since that directly leads to multi-organ vasculopathies and associated morbidities. This is usually accomplished by forcefully pushing glucose into tissues (via overcoming body's natural insulin resistance) [note: some drugs like acarbose & SGLT-2 do not increase insulin activity]
  - **Best ideal treatment** → **weight loss**. This would reduce insulin resistance, treat hyperglycemia, and avoid further weight gain. If pharmacological therapy is needed, Metformin is widely regarded as a wonderful first line drug.
- Type 1 Diabetes, pancreatic insufficiency, Latent Autoimmune Diabetes in Adults (LADA)
  - **Best ideal treatment** → exogenous insulin therapy, maybe artificial pancreas someday

Garg's Simple Medicine

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