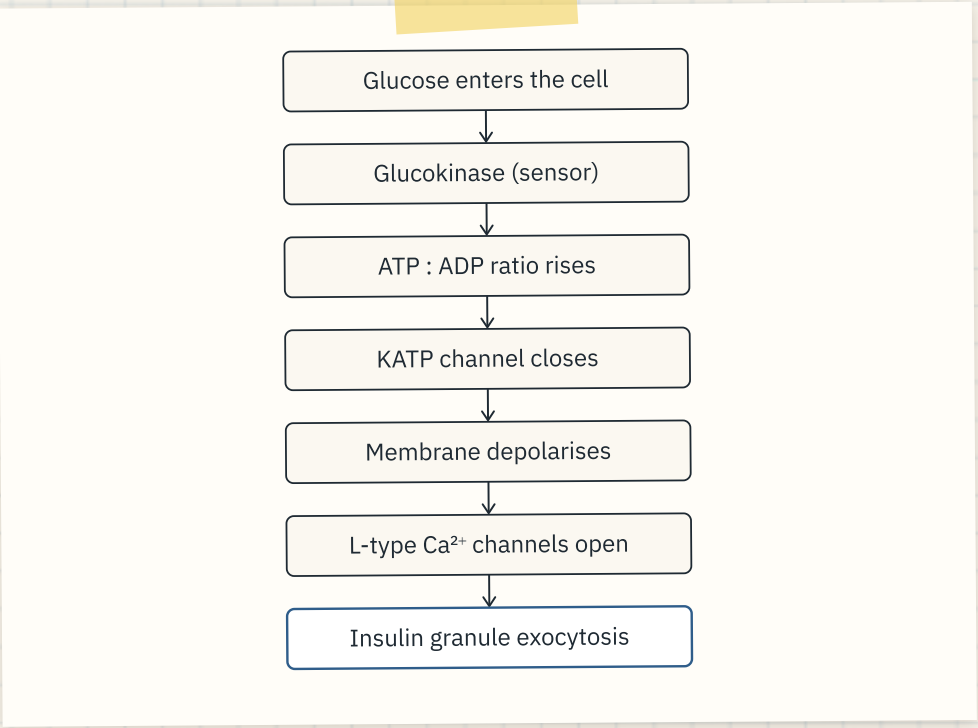
Beta cell insulin secretion

From glucose to granule, and where the drugs act



Step by step

1. Glucose in; glucokinase is the sensor
2. ATP rises, KATP channel closes
3. Membrane depolarises, L-type Ca^{2+} channels open
4. Ca^{2+} triggers exocytosis of insulin

Drug	KATP channel	Insulin release
Sulfonylurea	Closed (binds SUR1, no ATP needed)	Up, even at low or normal glucose
Diazoxide	Opened	Down

Drugs and the KATP channel

The chain

glucose → ATP → channel closed → depolarised → Ca^{2+} in → insulin out

Channel: 4 × Kir6.2 + 4 × SUR1

Release is biphasic: fast, then sustained

Exam traps

- Sulfonylureas skip the glucose and ATP steps: hypoglycaemia is the risk.
- Diazoxide is the opposite: it opens the channel.
- Ca^{2+} channels open after depolarisation, so they are not the drug target.

Insulin secretion in the beta cell: from glucose to granule

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/endocrinology/insulin-secretion-beta-cell

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