

# DIABETES MELITUS

Problems and how to manage

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# Permasalahan

- ▶ Menjaga kadar gula darah agar terkontrol/terkendali
- ▶ Mencegah komplikasi
- ▶ Menangani komplikasi yang sudah ada

# What is diabetes?

- ▶ Diabetes mellitus (DM) adalah sekumpulan gejala yang ditandai dengan naiknya kadar gula darah sebagai akibat dari defect pembentukan insulin, kerja insulin atau gabungan keduanya
- ▶ Akibat jangka panjang dari DM adalah kerusakan, disfungsi hingga kegagalan berbagai organ

# Types of Diabetes

- ▶ Type 1 Diabetes Mellitus
- ▶ Type 2 Diabetes Mellitus
- ▶ Gestational Diabetes
- ▶ Tipe lain:
  - ❖ LADA (Latent Autoimmune Diabetes in Adults)
  - ❖ MODY (maturity-onset diabetes of youth)
  - ❖ Secondary Diabetes Mellitus

# Diagnosis of Diabetes Mellitus



# DM PERKENI

- ▶ Pemeriksaan glukosa plasma puasa  $>126$  mg/dl. Puasa adalah kondisi tidak ada asupan kalori minimal 8 jam.
- ▶ Atau Pemeriksaan glukosa plasma  $\geq 200$  mg/dl 2 jam setelah Tes Toleransi Glukosa Oral (TTGO) dengan beban 75 gram. (peringkat bukti B)
- ▶ Atau Pemeriksaan glukosa plasma sewaktu  $\geq 200$  mg/dl dengan keluhan klasik.
- ▶ Atau Pemeriksaan HbA1c  $> 6,5\%$  dengan menggunakan metode High-Performance Liquid Chromatography (HPLC) yang terstandarisasi oleh National Glycohaemoglobin Standardization Program (NGSP).

# Values of Diagnosis of Diabetes Mellitus

## Values for diagnosis of diabetes mellitus and other categories of hyperglycaemia

	Glucose concentration, mmol l <sup>-1</sup> (mg dl <sup>-1</sup> )		
	Whole blood		Plasma <sup>a</sup>
	Venous	Capillary	Venous
<b>Diabetes Mellitus:</b>			
Fasting	≥ 6.1 (≥ 110)	≥ 6.1 (≥ 110)	≥ 7.0 (≥ 126)
<i>or</i>			
2-h post glucose load	≥ 10.0 (≥ 180)	≥ 11.1 (≥ 200)	≥ 11.1 (≥ 200)
<i>or both</i>			
<b>Impaired Glucose Tolerance (IGT):</b>			
Fasting (if measured)	< 6.1 (< 110)	< 6.1 (< 110)	< 7.0 (< 126)
<i>and</i>			
2-h post glucose load	≥ 6.7 (≥ 120) and < 10.0 (< 180)	≥ 7.8 (≥ 140) and < 11.1 (< 200)	≥ 7.8 (≥ 140) and < 11.1 (< 200)
<b>Impaired Fasting Glycaemia (IFG):</b>			
Fasting	≥ 5.6 (≥ 100) and < 6.1 (< 110)	≥ 5.6 (≥ 100) and < 6.1 (< 110)	≥ 6.1 (≥ 110) and < 7.0 (< 126)
<i>and</i> (if measured)			
2-h post glucose load	< 6.7 (< 120)	< 7.8 (< 140)	< 7.8 (< 140)

# Management of DM

- ▶ The major components of the treatment of diabetes are:

**A**

- **Diet and Exercise**

**B**

- **Oral hypoglycaemic therapy**

**C**

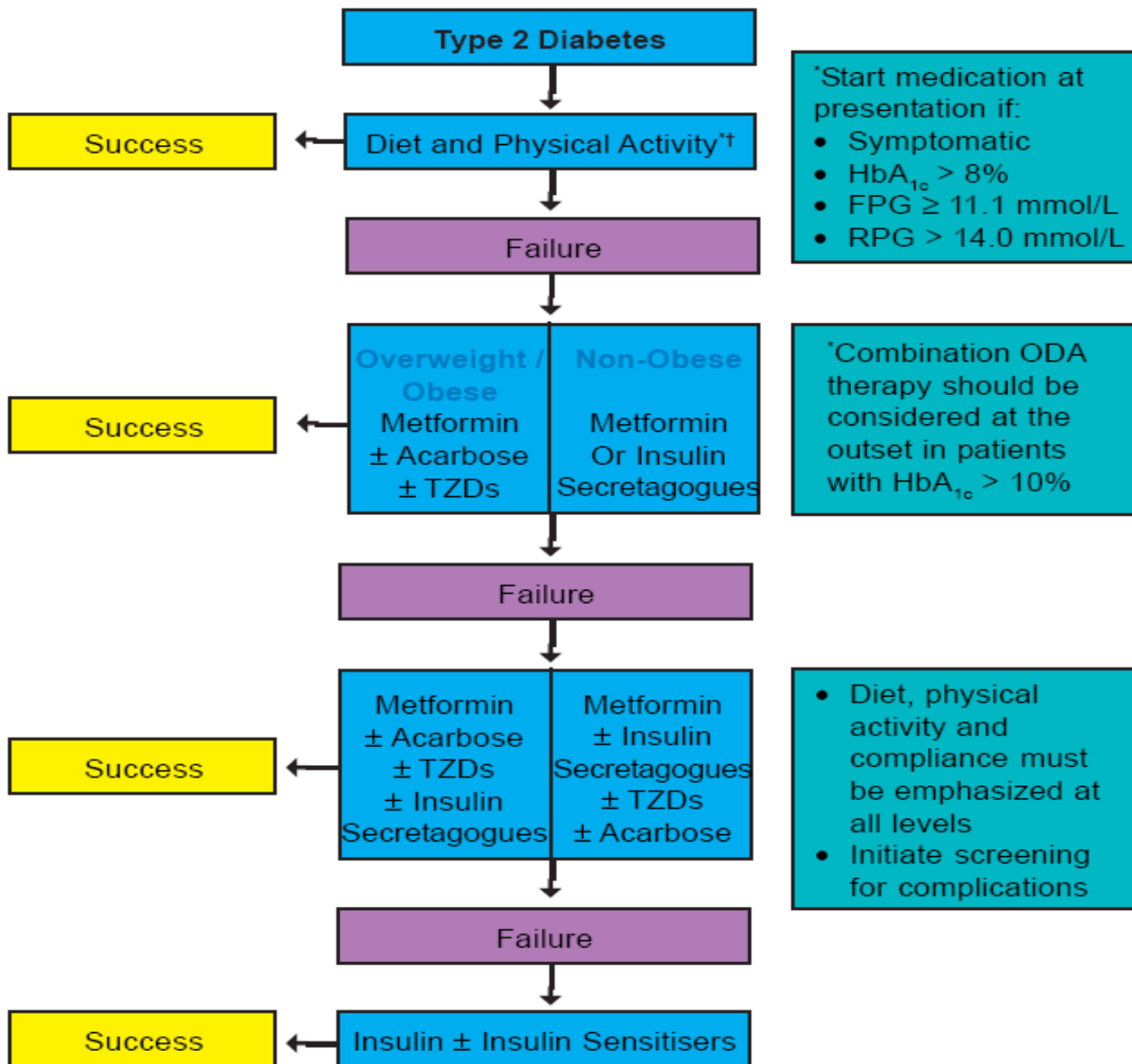
- **Insulin Therapy & antidiabetic injection**



## A. Diet (cont.)

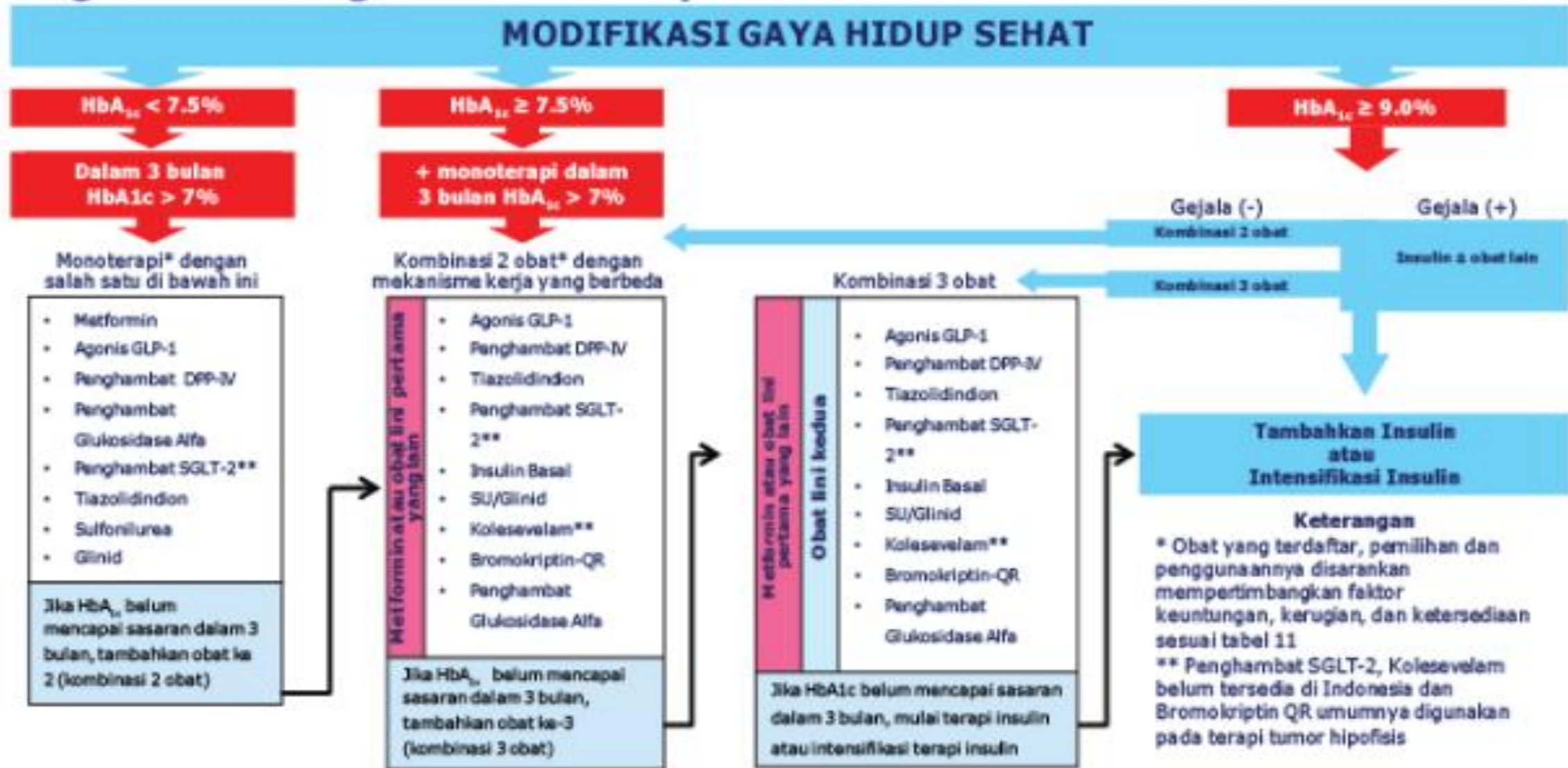
### Prinsip diet untuk diabetes:

- ▶ Lemak merupakan 25-35% dari total kalori, tetapi lemak jenuh tidak boleh lebih dari 10% dari total energy. Konsumsi kolesterol dibatasi <300mg/hari
- ▶ Protein : 10-15% total energy (0.8-1 g/kg BB ideal . Kebutuhannya meningkat pada anak-anak dan ibu hamil, Sumber protein dari nabati dan hewani.
- ▶ Carbohydrates : 50-60% of total kalori. Sumber carbohydrates sebaiknya dari karbohidrat kompleks dan tinggi serat



## Diabetes Management Algorithm

# Konsensus PERKENI 2015: Algoritme Pengelolaan DM Tipe 2 di Indonesia



Adapted from Razzah et al. When basal insulin therapy in type 2 Diabetes Mellitus is not enough—what next? *Diabetes Metab Res Rev* 2007;23:257.

Konsensus PERKENI: Pengelolaan dan Pencegahan Diabetes Mellitus Tipe 2 di Indonesia. 2015.

# Oral Hypoglycaemic Medications

## AGENTS & ACTIONS

Drug Class	Drug Name	Brand Name	Mechanism of Action
Biguanides	Metformin	Glucophage®	Inhibit glucose production by the liver
Sulfonylureas (second-generation)	Glimepiride Glipizide Glyburide	Amaryl® Glucotrol® Diabeta®, Glynase PresTab®, Micronase®	Increase insulin secretion by pancreatic beta cells
Meglitinides	Repaglinide Nateglinide	Prandin® Starlix®	Increase insulin secretion by pancreatic beta cells
Thiazolidinediones (TZDs)	Pioglitazone Rosiglitazone	Actos® Avandia®	Increase glucose uptake by skeletal muscle
Alpha-glucosidase inhibitors	Acarbose Miglitol	Precose® Glyset®	Inhibit carbohydrate absorption in the small intestine

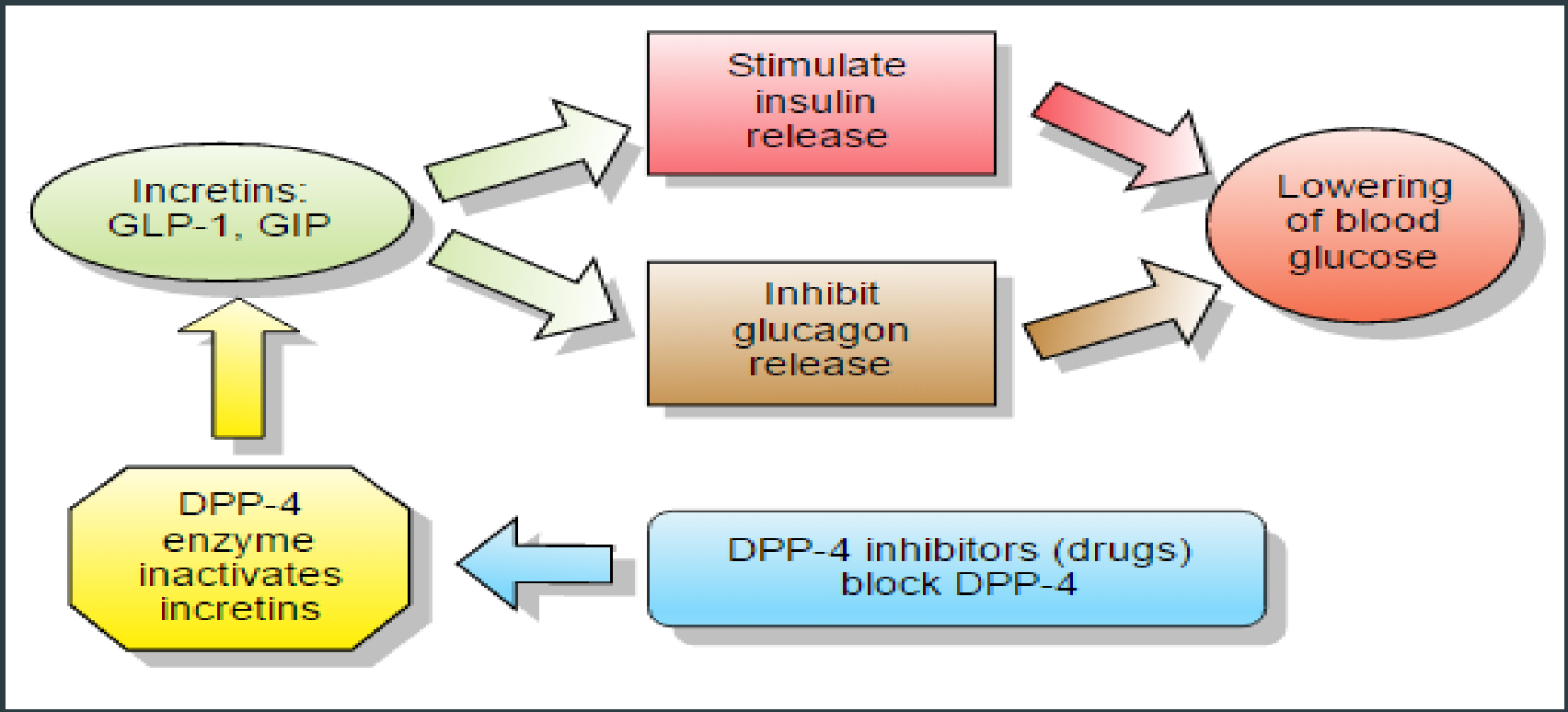
# New antidiabetic oral agent

## DPP-IV inhibitor {dipeptidyl peptidase IV} or gliptin

- ▶ Meningkatkan sekresi insulin
- ▶ Meningkatkan kadar inkretin yang menghambat pelepasan glukagon sehingga menurunkan sekresi glukagon

## SGLT 2 inhibitor {sodium Glucose cotransporter-2}

- ▶ Menurunkan glucose reabsorption di distal tubulus renalis
- ▶ Meningkatkan sensitivitas insulin dan uptake glukosa di otot, menurunkan gluconeogenesis dan meningkatkan fase 1 pelepasan insulin dari sel beta pancreas
- ▶ Contoh : empagliflozin, canagliflozin, dapagliflozin, ipragliflozin



# C. Insulin Therapy

## Penggunaan jangka pendek:

- ▶ Sakit akut, operasi, stress dan gawat darurat
- ▶ Kehamilan
- ▶ menyusui
- ▶ Bisa digunakan untuk inisial terapi untuk DM tipe 2 yang GDS tinggi
- ▶ Dekompensasi metabolik berat (diabetic ketoacidosis, hyperosmolar nonketotic coma, lactic acidosis, severe hypertriglyceridaemia)

## Penggunaan jangka panjang:

- ▶ Jika target GDS tidak tercapai dengan menggunakan dosis optimal terapi kombinasi oral anti DM

## Types of insulin

Insulin type/action (appearance)	Brand names (generic name in brackets)	Basal/bolus	Dosing schedule
<b>Rapid-acting analogue (clear)</b> Onset: 10–15 minutes Peak: 60–90 minutes Duration: 4–5 hours	Humalog® (insulin lispro) NovoRapid® (insulin aspart)	Bolus	Usually taken right before eating or to lower high blood glucose
<b>Short-acting (clear)</b> Onset: 0.5–1 hour Peak: 2–4 hours Duration: 5–8 hours	Humulin®-R Novolin®ge Toronto	Bolus	Taken about 30 minutes before eating, or to lower high blood glucose
<b>Intermediate-acting (cloudy)</b> Onset: 1–3 hours Peak: 5–8 hours Duration: up to 18 hours	Humulin®-N Novolin®ge NPH	Basal	Often taken at bedtime, or twice a day (morning and bedtime)
<b>Extended long-acting analogue (Clear and colourless)</b> Onset: 90 minutes Peak: none Duration: 24 hours	Lantus® (insulin glargine) Levemir® (insulin detemir)	Basal	Usually taken once or twice a day
<b>Premixed (cloudy)</b> A single vial contains a fixed ratio of insulins (the numbers refer to the ratio of rapid- or fast-acting to intermediate-acting insulin in the vial)	Humalog® Mix 25™ Humulin® (20/80, 30/70) Novolin®ge (10/90, 20/80, 30/70, 40/60, 50/50)	Combination of basal and bolus insulins	Depends on the combination



# NEW ANTI DIABETIC INJECTION AGENT

## Agonis GLP 1 inhibitor /incretin mimetic

- ▶ Digunakan hanya untuk type 2 diabetes.
- ▶ Keunggulan dibanding insulin secretagogues generasi terdahulu adalah risiko hipoglikemia yang
- ▶ Approved GLP-1 agonists:
  - exenatide (Byetta/Bydureon), approved in 2005/2012
  - liraglutide (Victoza, Saxenda), approved 2010
  - albiglutide (Tanzeum), approved in 2014 by GSK
  - dulaglutide (Trulicity), approved in 2014—manufactured by Eli Lilly K
- ▶ Tidak ada efek peningkatan berat badan

# Self-Care

- ▶ Pasien harus diedukasi cara merawat diri sendiri, termasuk tanggung jawab mengontrol penyakit DM, YAITU
  - Memonitor gula darah mandiri Blood glucose monitoring
  - Monitoring BB
  - Perawatan kaki
  - Personal hygiene
  - Healthy lifestyle/diet atau physical activity
  - Ingat untuk k0ntrol
  - Berhenti merokok



# Komplikasi DM

- ▶ Makrovaskular
- ▶ Mikrovaskular
- ▶ Kombinasi keduanya

# Managemen komplikasi jika sudah muncul

- ▶ Kendalikan GD sesuai target
- ▶ Pola hidup sehat
- ▶ Obat penunjang sesuai komplikasi yang timbul

THANK YOU

