

MEDICINES FOR TYPE 2 DIABETES

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Medicine Name	FDA Approval	Formulations (color indicated if available by Brand only)	Dosing	Comments (SE= possible side effects)
STIMULATORS OF INSULIN RELEASE (Insulin Secretagogues) - increase insulin secretion from the pancreas¹				
SULFONYLUREAS (SFUs)				
Tolbutamide Orinase® various generics	1957	500 mg tablets	Initial: 1000-2000 mg daily Range: 250-3000 mg (seldom need >2000 mg/day) Taken two or three times daily	SE: hypoglycemia, weight gain Preferred SFU for elderly Must be taken 2-3 times daily
Glimepiride Amaryl® various generics	11/95	1 mg, 2 mg, 4 mg tablets	Initial: 1-2 mg daily Range: 1-8 mg Taken once daily	SE: hypoglycemia, weight gain Need to take only once daily
Glipizide Glucotrol® Glucotrol XL® various generics	5/84 4/94	5 mg, 10 mg tablets ER: 2.5 mg, 5 mg, 10 mg tablets	Initial: 5 mg daily Range: 2.5-40 mg ² (20 mg for XL) Taken once or twice (if >15 mg) daily	SE: hypoglycemia, weight gain Preferred SFU for elderly ER = extended release/take once a day
Glyburide Micronase®, DiaBeta® various generics	5/84	1.25 mg, 2.5 mg, 5 mg tablets	Initial: 2.5-5 mg daily Range: 1.25-20 mg ² Taken once or twice daily	SE: hypoglycemia, weight gain
Glyburide, micronized Glynase PresTab® various generics	3/92	1.5 mg, 3 mg, 4.5 mg, 6 mg micronized tablets	Initial: 1.5-3 mg daily Range: 0.75-12 mg Taken once or twice (if >6 mg) daily	SE: hypoglycemia, weight gain
GLINIDES				
Repaglinide Prandin®	12/97	0.5 mg (white), 1 mg (yellow), 2 mg (red) tablets	Initial: 1-2 mg daily (0.5 mg if A1C <8%) Range: 0.5-16 mg Max dose per meal is 4 mg Taken two, three, or four times daily	SE: hypoglycemia Safe for elderly Duration of action is only 4 hours Take within 15-30 minutes of meal
Nateglinide Starlix®	12/00	60 mg (pink), 120 mg (yellow) tablets	Initial: 120 mg three times daily (if A1C close to goal, use 60 mg) Range: 180-360 mg Taken three times daily	SE: hypoglycemia Safe for elderly Duration of action is only 2 hours Take within 30 minutes of meal
EUGLYCEMICS: Medicines that bring the blood glucose into the normal range. These medicines should not cause hypoglycemia.³				
BIGUANIDES: decreases glucose release from liver				
Metformin Glucophage® Extended release (ER): Glucophage XR® Fortamet® Glumetza Riomet® (liquid, 500 mg/5ml)	12/94 10/00	Glucophage: 500 mg, 850 mg, 1000 mg Glucophage XR: 500 mg, 750 mg Fortamet: 500 mg, 1000 mg Glumetza: 500 mg, 1000 mg Generic metformin ER: 500 mg, 750 mg Generic metformin: 500 mg, 850 mg, 1000 mg Available in tablets (large)	Initial: 500 mg twice daily or 850 mg once daily Range: 500-2550 mg Taken two or three times daily ER: Initial: 500 mg once daily Range: 500-2000 mg (500-2500 mg Fortamet) Dosed once daily	SE: Gastrointestinal symptoms (diarrhea, nausea/vomiting, u stomach), headache, metallic taste (rare) lactic acidosis (0.03 cases/1000 people) ^{4,5} Take with meals (ER with evening meal) Cannot use if have liver or kidney problems, have severe hea failure, or drink alcohol excessively

¹ SFUs, repaglinide and nateglinide can cause hypoglycemia. The risk of hypoglycemia is increased when meals are skipped. Avoid skipping meals.

² "Clinical" maximum daily dose for glyburide is 10 mg and glipizide is 20 mg; higher doses are not likely to further lower the blood glucose.

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ALPHA-GLUCOSIDASE INHIBITORS: STARCH BLOCKERS - delay digestion and absorption of carbohydrates

Acarbose Precose® various generics	9/95	25 mg, 50 mg, 100 mg tablets	Initial: 25 mg three times daily Range: 75-300 mg (max 150 mg if <60 kg) Taken three times daily	SE: flatulence (tends to subside with time) Take with first bite of meal Start with low dose and slowly ↑ to minimize GI intolerance.
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THIAZOLIDINEDIONES (Glitazones or TZDs): decrease insulin resistance in the body (muscle and fat tissues)

Pioglitazone (preferred over rosiglitazone) Actos®	7/99	15 mg, 30 mg, 45 mg (white to off-white) tablets	Initial: 15-30 mg daily Range: 15-45 mg Max with heart failure: 15 mg daily Taken once daily	SE: anemia, swelling (edema) from fluid retention, weight gain macular edema (in eye), bone loss and fractures in women May cause or worsen heart failure Cannot use if have liver problems or severe heart failure Requires liver monitoring ⁶
Rosiglitazone Avandia®	5/99	2 mg (pink), 4 mg (orange), 8 mg (red-brown) tablets	Initial: 4 mg daily Range: 4-8 mg Taken once or twice daily	SE: same as pioglitazone May ↑ risk of heart problems such as heart-related chest pain (angina) or heart attack (myocardial infarction)

GLP-1 ANALOGS: increase insulin secretion, reduce glucose release from liver after meals, delay food emptying from stomach and promote satiety

Exenatide Byetta® Extended release (ER): Bydureon™	4/05 01/12	5 mcg and 10 mcg per dose Injected under the skin (subcutaneous/SQ) Available in a pen device Bydureon (reconstituted): 2mg Inject immediately after reconstitution Available in syringe (single dose tray)	Initial: 5 mcg SQ twice daily Range: up to 10 mcg SQ twice daily Taken twice daily before meals ER: 2 mg SQ once every 7 days Taken once weekly	SE: nausea, headache, injection site nodule (Bydureon) Rare reports of sudden pancreatitis (inflammation of pancreas) May cause mild weight loss Cannot use Bydureon if family history of medullary thyroid carcinoma (MTC) or if have multiple endocrine neoplasia syndrome type 2 (MEN2)
Liraglutide Victoza®	01/10	3 mL pen that delivers doses of 0.6 mg, 1.2 mg, or 1.8 mg Injected under the skin (subcutaneous/SQ) Available in a pen device	Initial: 0.6 mg SQ once daily Range: up to 1.8 mg SQ once daily Taken once daily	SE: nausea, headache, diarrhea, hypoglycemia (when used with insulin secretagogues) Rare reports of sudden pancreatitis (inflammation of pancreas) Cannot be used if have history of medullary thyroid cancer

DPP-4 INHIBITORS: increase insulin secretion, reduce glucose release from liver after meals

Alogliptin Nesina	01/13	6.25mg (light pink), 12.5mg (yellow), 25mg (light red) tablets	25mg PO daily. Taken once daily.	SE: stuffy or runny nose, sore throat, headache, upper respiratory infection, rare severe allergic reactions (swelling of tongue, throat, face or body; severe rash); rare reports of pancreatitis No weight gain
Sitagliptin Januvia®	11/06	25 mg (pink), 50 mg (light beige), 100 mg (beige) tablets	Initial: 100 mg daily Range: 25-100 mg daily Taken once daily	SE: stuffy or runny nose, sore throat, headache, upper respiratory infection, rare severe allergic reactions (swelling of tongue, throat, face or body; severe rash); rare reports of pancreatitis No weight gain; Lower doses used if kidney problems
Saxagliptin Onglyza®	7/09	2.5 mg (pale to light yellow), 5 mg (pink) tablets	Initial: 2.5 or 5 mg daily Range: 2.5-5 mg daily Taken once daily	SE: edema (swelling), upper respiratory infection, urinary tract infection, headache No weight gain; Lower doses used if kidney problems
Linagliptin Tradjenta®	5/11	5mg (light red) tablets	Initial: 5 mg daily Taken once daily	SE: stuffy or runny nose, headache, cough, diarrhea, upper respiratory infection, rare severe allergic reactions (swelling of tongue, throat, face or body; severe rash); rare reports of pancreatitis. No weight gain

SGLT2 inhibitors: increase glucose excretion in the urine

Canagliflozin Invokana	03/13	100mg (yellow, capsule-shaped), 300mg (white, capsule-shaped) tablets	Initial: 100mg PO daily Range: 100-300mg PO daily Taken once daily	SE: increased urination or urgency, urinary tract infection, yeast infection of the vagina or penis, increase in blood potassium; severe allergic reactions (swelling of tongue, throat, face or body severe rash) and kidney problems.
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³ These medicines do not cause hypoglycemia when used *alone*. However, when used *with* SFUs, repaglinide, nateglinide, or insulin, hypoglycemia may occur.

⁴ Lactic acidosis symptoms: feeling very weak, tired or uncomfortable; unusual muscle pain, trouble breathing, unusual or unexpected stomach discomfort, feeling cold, feeling dizzy or lightheaded, or suddenly developing a slow or irregular heartbeat.

⁵ Radiologic tests using iodinated contrast media: stop metformin at the time of or prior to the procedure, and withhold for 48 hours after procedure and restart after kidney function has been re-evaluated found to be normal.

⁶ Liver toxicity symptoms: unexplained nausea, vomiting, stomach pain, unusual tiredness, loss of appetite, dark urine, or yellowing of the skin or whites of eyes.

COMBINATION ORAL PILLS (color indicated if available by Brand only)

Alogliptin/Metformin Kazano	01/13	12.5mg/500mg (pale yellow, oblong), 12.5mg/1000mg tablets (pale yellow) oblong tablets	Initial: 12.5mg/500mg once or twice daily Range: up to 25/2000 mg Taken twice daily with food.	Same as above with alogliptin and metformin.
Alogliptin/Pioglitazone Oseni	01/13	12.5mg/15mg (pale yellow), 12.5mg/30mg (pale peach, round), 12.5mg/45mg (pale red), 25mg/15mg (yellow, round), 25mg/30mg (peach), 25mg/45mg (red) round tablets	Initial: 12.5mg/15mg once daily Range: up to 25/45 mg Taken once daily with or without food.	Same as above with alogliptin and pioglitazone.
Glyburide/Metformin Glucovance® various generics	7/00	1.25 mg/250 mg, 2.5 mg/500 mg, 5 mg/500 mg (yellow) tablets	Initial: 1.25 mg/250 mg once or twice daily Range: up to – 20/2000 mg Taken once or twice daily	Same as above with glyburide and metformin
Glipizide/Metformin Metaglip® various generics	10/02	2.5 mg/250 mg, 2.5mg/500 mg, 5mg/500 mg tablets	Initial: 2.5 mg/250 mg daily or 2.5mg/500 mg twice daily Range: up to 20/2000 mg Taken once or twice daily	Same as above with glipizide and metformin
Linagliptin/Metformin Jentadueto	01/12	2.5mg/500mg (light yellow), 2.5mg/850mg (light orange, oval), 2.5mg/1000mg tablets (light pink) oval tablets	Initial: 2.5mg/500mg twice daily with food Range: up to 2.5mg/1000mg twice daily with food.	Same as above with linagliptin and metformin
Rosiglitazone/Metformin Avandamet® various generics	10/02	2 mg/500 mg, 2 mg/1000 mg, 4 mg/500 mg, 4 mg/1000 mg (pink) oval tablets	Initial: 2 mg/500 mg once or twice daily Range: up to 8 mg/2000 mg Taken once or twice daily	Same as above with metformin and rosiglitazone
Pioglitazone/Metformin ActoPlus Met® various generics	8/05	15 mg/500 mg, 15 mg/850 mg tablets	Initial: 15 mg/500 mg or 15 mg/850 mg once or twice daily Range: up to 45 mg/2550 mg Taken once or twice daily	Same as above with metformin and pioglitazone
Pioglitazone/Glimepiride Duetact®	7/06	30 mg/2 mg, 30 mg/4 mg (white to off-white) tablets	Initial: 30 mg/2 mg or 30 mg/4 mg once daily Range: max of one tablet daily Taken once daily	Same as above with pioglitazone and glimepiride
Rosiglitazone/Glimepiride Avandaryl® various generics	11/05	4 mg/1 mg, 4 mg/2 mg, 4 mg/4 mg, 8 mg/2 mg, 8 mg/4 mg tablets	Initial: 4 mg/1 mg or 4 mg/2 mg once daily Range: up to 8 mg/4 mg Taken once daily	Same as above with rosiglitazone and glimepiride
Sitagliptin/Metformin Janumet®	03/07	50 mg/500 mg (light pink), 50 mg/1000mg (red) oblong tablets	Initial: 50 mg/500 mg or 50 mg/1000 mg twice daily Range: up to 100 mg/2000 mg Taken twice daily	Same as above with sitagliptin and metformin
Janumet XR®	2/12	50 mg/500 mg (light blue), 50 mg/1000 mg (light green),	Initial: 100 mg/1000 mg daily	

		100 mg/ 1000 mg (blue) oval tablets	Range: up to 100 mg/2000 mg daily Taken once daily	
Repaglinide/Metformin PrandiMet®	06/08	1 mg/500 mg (yellow), 2 mg/500 mg (pink) oval tablets	Initial: 1 mg/500 mg twice daily Range: 10 mg/2500 mg max daily, 4 mg/1000 mg max per dose Taken twice or three times daily	Same as above with repaglinide and metformin
Pioglitazone/Metformin XR ActoPlus Met XR®	05/09	15 mg/1000 mg, 30 mg/1000 mg (white to off-white) round tablets	Initial: 15 mg/1000 mg or 30 mg/1000 mg once daily w/ evening meal Range: up to 45 mg/2000 mg Taken once daily	Same as above with metformin and pioglitazone
Saxagliptin/Metformin XR Kombiglyze XR®	11/10	5 mg/500 mg (light brown to brown), 5 mg/1000 mg (pink), 2.5 mg/1000 mg (pale yellow to light yellow) capsules	Initial: 5 mg/500 mg or 5 mg/1000 mg once daily Range: up to 5 mg/2000 mg Taken once daily	Same as above with metformin and saxagliptin

Table is prepared with information from package inserts of the various medications and opinion of the UCSF Diabetes Teaching Center.

This table is not meant to be all inclusive and contains important educational information, as viewed by the UCSF Diabetes Teaching Center.

Colesevelam and bromocriptine are FDA-approved for use in type 2 diabetes; the Center does not currently use these for diabetes treatment.

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