

Multiple Sclerosis: Disease-Modifying Therapies

Injections

	Interferons				Non-interferons	
Brand name	AVONEX	BETASERON or EXTAVIA	PLEGRIDY	REBIF	COPAXONE	GLATOPA
EFFICACY*	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	
SAFETY	★★★★★				★★★★★	
Available since	1996	1993 (Betaseron)	2014	2002	1996	2015
How given	Intramuscular injection	Subcutaneous injection			Subcutaneous injection	
Frequency	Every 7 days	Every other day	Every 14 days	3 times a week	3 times a week or daily	Daily
Common side effects	<ul style="list-style-type: none"> • Injection site reactions (except not with Avonex) • Flu-like symptoms (aching, fever) lasting 8-18 hours after injection • May worsen depression 				<ul style="list-style-type: none"> • Injection site reactions • Rare post-injection systemic reactions 	
Autoinjector	Yes				Yes	
Premixed	Premixed	No	Premixed		Premixed	
Blood tests required	Blood and liver tests every 3-6 months				None	
Support services	Above MS 1-800-456-2255 www.Avonex.com	MS Pathways 1-800-788-1467 www.Betaseron.com Extavia 1-866-925-2333 www.Extavia.com	Above MS 1-800-456-225 www.Plegridy.com	MS Lifelines 1-877-447-3243 www.Rebif.com	Shared Solutions 1-800-887-8100 www.Copaxone.com	Glatopa Care 1-855-452-8672 www.Glatopa.com

*Comparative efficacy has not been determined with absolute certainty for each possible pair of MS therapies.

The value provided here is our best estimate



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Pills or Capsules

Brand name	GILENYA	AUBAGIO	TECFIDERA
EFFICACY*	★★★★☆	★★★★☆	★★★★☆
SAFETY	★★★☆☆	★★★★☆	★★★★☆
Available since	2010	2012	2013
How given	Once a day, capsule	Once a day, pill, 7 or 14 mg	Twice a day, capsule, 120 or 240 mg
Common side effects	<ul style="list-style-type: none"> • First dose slowing of pulse, 6 hrs • Decreased lymphocyte count 	<ul style="list-style-type: none"> • Hair thinning (12%) • Diarrhea/nausea (18%) • Decreased lymphocyte count 	<ul style="list-style-type: none"> • Flushing (40%) • GI (nausea, diarrhea), (20%) • Decreased lymphocyte count
Rare side effects	<ul style="list-style-type: none"> • Macular edema (7/1000) • Posterior reversible encephalopathy syndrome (1:10,000) • Blood pressure (average 3mm systolic, 2 diastolic increase) • skin cancer (2% vs 1% placebo) 	<ul style="list-style-type: none"> • Peripheral neuropathy (1.9%) • Elevated liver function tests • Serious skin reactions • Acute renal disease (0.6%) • Lung disease • Increased blood pressure 	<ul style="list-style-type: none"> • Itching
Infection risk	<ul style="list-style-type: none"> • PML: 1/18,000 • Cryptococcal meningitis 1/20,000 • Shingles 	<ul style="list-style-type: none"> • Tuberculosis • Other rare bacterial infections 	<ul style="list-style-type: none"> • PML: 1/30,000 (5 cases, all with low lymphocyte counts)
Monitoring requirements	First dose: observe for 6 hours Eye examination baseline + 6 months	Liver function tests monthly X6, then quarterly	Lymphocyte counts every 3-6 months
Time to elimination	Average 45 days	Up to 2 years (11-day rapid elimination available)	5-24 hours
Test needed prior to start	Eye examination Blood tests Electrocardiogram	Blood tests Tuberculosis test Pregnancy test	Blood tests
Support services	Gilenya Go Program 1-800-445-3692 www.Gilenya.com	MS One to One 1-855-676-6326 www.Aubagio.com	Above MS 1-800-456-2255 www.Tecfidera.com

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Intravenous + Zinbryta

Brand name	TYSABRI	LEMTRADA	ZINBRYTA	OCREVUS
EFFICACY*	★★★★★	★★★★★	★★★★☆	★★★★★
SAFETY	★★★☆☆	★★★☆☆	★★★☆☆	★★★★☆
Available since	2004	2014	2016	2017
Frequency of infusions	Every 4 weeks	Year 1: 5 days in a row Year 2: 3 days in a row After that: as needed	Subcutaneous injections Monthly	First: 2 infusions, 2 weeks apart Then: 1 every 6 months
Time of infusions	1 hour + 1 hour observation	4 hours + 2 hours observation. Usually 8 hours total	NA	First: 2 ½ hours + 1 hour observation. 4 ½ - 5 hours total Then: 3 ½ hours + 1 hour observation. 5 ½ - 6 hours total
Common side effects	<ul style="list-style-type: none"> • Infusion reactions 	<ul style="list-style-type: none"> • Infusion reactions (may be severe) • Thyroid disorders (34%) 	<ul style="list-style-type: none"> • Skin reactions • Immune-mediated disorders • May worsen depression 	<ul style="list-style-type: none"> • Infusion reactions
Rare side effects	<ul style="list-style-type: none"> • Liver injury • Allergic reactions 	<ul style="list-style-type: none"> • Platelets (immune thrombocytopenia purpura): 2% • Kidney: autoimmune kidney • Allergic reactions • Thyroid cancer (0.2%) • Melanoma (0.3%) 	<ul style="list-style-type: none"> • Liver injury (1-5%) • Serious skin reactions (2%) • Lymph node enlargement (6%) • Colon irritation (<1%) • Allergic reactions 	<ul style="list-style-type: none"> • Possible cancer (uncertain) • Possible breast cancer (uncertain)
Infection risk	<ul style="list-style-type: none"> • PML: JCV Ab negative 1/10,000 JCV Ab positive 1/800 • Shingles 	<ul style="list-style-type: none"> • Shingles • Listeriosis (short-term) • Human papilloma virus 	<ul style="list-style-type: none"> • Serious infections (3-4%) • Tuberculosis 	<ul style="list-style-type: none"> • Possible respiratory • Possible herpes • Possible PML • Reactivation of hepatitis B
Monitoring	JCV Antibody quarterly	Before: Tuberculosis, blood urine. Monthly to 4 years after last dose: blood and urine. Annual skin exam. Annual pap smear.	Blood before Blood monthly to 6 months after last dose	Blood before
Support services	Above MS 1-800-456-2255 www.Tysabri.com	MS One to One 1-855-676-6326 www.Lemtrada.com	Above MS 1-800-456-2255 www.Zinbryta.com	Genentech Access Solutions (866) 422-2377 www.Ocrevus.com

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