Rebif® (REE bif)
Generic name: interferon beta-1a (in ter FEER on, BAY ta, won ay)

What is Rebif®?
Interferons are proteins made in the body to regulate the immune system. They provide chemical signals that increase or decrease the activity of various cell types within the immune system. Rebif® was made by splicing the human gene for interferon beta-1b into mammalian cells that are grown in tissue culture. The interferon made by these cells is isolated and purified to make the medication.

Rebif® decreases the ability of immune cells to react to myelin antigens. It shifts the immune reaction away from Th1 type cells (which tend to promote autoimmune reactions) and towards Th2 type cells (which tend to block autoimmune disease). It also makes it more difficult for cells to cross from the bloodstream into the brain. This medicine does not suppress the immune system, and patients taking it do not have an increased risk of infection.

Rebif® slows the course of multiple sclerosis when used regularly over long periods of time. It does not improve existing symptoms and is not used to treat acute MS attacks.

Starting on Rebif®.
To obtain Rebif®, a form must be completed and faxed to the MS LifeLines® program. This program, operated by EMD Serono and Pfizer (the manufacturer of Rebif®), will start the process of obtaining the medication. The MS Center staff will assist with completion of these forms and getting insurance approval. It takes about 10-14 days to get insurance approval. The medication is then shipped overnight to either your home or your pharmacy (depending on insurance requirements).

After the medication arrives, those living near the Center should contact our nurse for training on how to administer the Rebif®. Those living outside our region will have training done by visiting nurses.

When first starting Rebif®, it should be started at a low dose and tapered upwards. Rebif® provides a titration kit that has numbered syringes with the correct dose for titration during the first four weeks. After that, regular Rebif® kits at full dose are used.

Rebif® often causes aching and fevers (flu-like side effects) when first starting on the medication. These occur about an hour after the injection, and last about 8 hours. These side effects can be minimized by:

- Taper upwards from a low dose when starting the medication (see above)
• Take medications for this in the beginning. These should be taken at the time of the injection and if needed the following day. They should be taken with each dose until the full dose of Rebif® is achieved. At that time, if side effects are tolerable then the medications to prevent these side effects can be tapered. Medications that help minimize the flu-like side effects include:
  o Ibuprofen (Advil, Motrin): can take up to 800mg three times a day
  o Naproxen (Aleve): can take up to 250-550mg twice a day
  o Aspirin: can take up to 650mg every six hours
  o Acetaminophen (Tylenol and others): can take up to 650-1000mg every 6 hours
• Inject the medication at bedtime so that most of the side effects occur during sleep

**How should Rebif® be taken?**
Rebif® is given by injection under the skin.
Volume injected: 0.5 mL (0.5 cc).
Needle size: 29 gauge, ½ inch length
Autoinjector: available for those who want to use it.
Frequency: three times a week, about 48 hours apart (for example: Monday, Wednesday, Friday)
Injection site locations: Injections should be rotated among various sites. Sites include front of the thighs, back of arms, buttocks and abdomen.
Mixing: Rebif® comes in two forms: prefilled syringes or Rebidose pens (preloaded autoinjectors).

Laboratory tests should be done to check for blood counts and liver function. There is no standard frequency for these tests, but our Center does blood tests about every three months during the first year with lesser frequencies after that. Thyroid testing is indicated if symptoms of thyroid dysfunction develop.

**What if a dose is missed?**
Take the next dose as soon as you can after remembering. Doses should be given about 48 hours apart.

**How should Rebif® be stored?** Rebif® should be refrigerated. However, it may be kept at room temperature for up to 30 days.

**How supplied:** Rebif® comes in prepackaged kits containing all needed supplies. It comes in two forms:
Single dose prefilled syringes. There are 12 syringes per pack.
Rebidose pens (preloaded autoinjectors). There are 12 pens per pack.

**What are the common side effects?**
Injection site reactions: It is common to get a red spot at the site of the injection. This is sometimes accompanied by a lump under the skin or itching. On rare occasion, the injection site may break down into a sore (necrosis) that may be slow to heal. Injection site reactions can be minimized by:

- Keep the needle and other equipment clean.
- Rotating the sites. If particular body locations are more prone to these reactions, those sites may be removed from the rotation.
- Some find that applying warm packs before or after the injection may help. Others find that cool packs help. Experiment to see which works best for you.
- Set the needle depth deeper to keep the medication from reacting just beneath the skin. Rebidose pen depth cannot be adjusted but the autoinjector for the prefilled syringe can be adjusted.
- Don’t remove the air bubble, and don’t squirt the drug out the end of the needle that you use to inject with. The medication left on the tip of the needle may track to the surface of the skin.
- Lidocaine creams such as Emla® or Elamax® may decrease injection site pain on the surface of the skin.
- Hydrocortisone cream may decrease the inflammation.

Injection site bruising: This is caused by blood leaking along the needles tract. This can be minimized by applying firm pressure to the injection site for a full minute, immediately after removing the needle.

Flu-like side effects: Aching and fevers are common after these injections. Gastrointestinal symptoms (nausea, vomiting, diarrhea) are not usually seen with this medication. This side effect responds to tapering of the dose, use of analgesics, and taking the medication at bedtime (see above).

Liver injury. Rarely, liver injury may occur. This is monitored with periodic blood tests. Action is usually not needed unless laboratory tests are elevated more than three times above normal. The changes are reversible if the medication is stopped or the dose reduced.

White blood counts commonly decrease. There is no need to adjust the medication unless the white blood count falls excessively.

Depression. It is uncertain whether this medication causes depression. Depression should be monitored in those taking the medication.

Thyroid dysfunction may occur. If symptoms develop then blood testing for thyroid function is recommended.

**Sharps container:** Needles must be disposed of properly. We recommend using a needle clipper such as the Becton Dickinson Safe-Clip™ (www.bd.com/us/diabetes). This clips off the needles, allowing the rest of the syringe to be disposed of in the trash. Other disposal options may be available through your local solid waste disposal company.
Rebidose pens may be disposed of using a regular FDA-approved sharps disposal container, or you may sign up for the Rebidose disposal program. This program allows you to dispose of used Rebidose pens free of charge. You may sign up for this program by calling MS Lifelines at 1-877-447-3243.

Company Support:
MS LifeLines® 1-877-447-3243 Provides financial assistance, insurance assistance, information about Rebif® and multiple sclerosis.
www.Rebif.com
Insurance billing code: J3490