Ramucirumab (Cyramza®)

**Pronounced:** RA-myoo-SIR-yoo-mab

**Classification:** Monoclonal Antibody

### About Ramucirumab (Cyramza®)

Ramucirumab is a monoclonal antibody. Monoclonal antibodies are created in a lab to attach to the targets found on specific types of cancer cells. The antibody "calls" the immune system to attack the cell it is attached to, resulting in the immune system killing the cell. These antibodies can work in different ways, including stimulating the immune system to kill the cell, blocking cell growth or other functions necessary for cell growth. Ramucirumab inhibits the activity of vascular endothelial growth factor (VEGF). VEGF is responsible for angiogenesis, or the development of new blood vessels by and for the tumor (or any tissue), so blocking VEGF’s activity prevents the growth of new blood vessels, essentially cutting off the tumor’s source of nutrients.

### How to Take Ramucirumab

Ramucirumab is given by intravenous (IV, into a vein) infusion. The actual dosage depends on the patient’s weight. It may be given in combination with other chemotherapy medications. Prior to each dose, you may be given medications, including acetaminophen and an antihistamine (such as diphenhydramine), to decrease the risk of an infusion reaction.

### Possible Side Effects of Ramucirumab

There are a number of things you can do to manage the side effects of ramucirumab. Talk to your care team about these recommendations. They can help you decide what will work best for you. These are some of the most common or important side effects:

#### Low Platelet Count (Thrombocytopenia)

Platelets help your blood clot, so when the count is low you are at a higher risk of bleeding. Let your oncology care team know if you have any excess bruising or bleeding, including nose bleeds, bleeding gums or blood in your urine or stool. If the platelet count becomes too low, you may receive a transfusion of platelets.

- Do not use a razor (an electric razor is fine).
- Avoid contact sports and activities that can result in injury or bleeding.
- Do not take aspirin (salicylic acid), non-steroidal, anti-inflammatory medications (NSAIDs) such as Motrin/Advil (ibuprofen), Aleve (naproxen), Celebrex (celecoxib) etc. as these can all increase the risk of bleeding. Please consult with your healthcare team regarding use of these agents and all over the counter medications/supplements while on therapy.
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

#### Hemorrhage (Bleeding)

Serious bleeding has also occurred in patients treated with this medication. People who have a history of serious bleeding should not take this medication. If you take aspirin, non-steroidal anti-inflammatory medications (i.e. Motrin, ibuprofen, naproxen) or other medication that interferes with blood clotting, let your healthcare provider know. Signs of bleeding can include: nose bleeds, blood in the stool or dark, tarry stools, coughing up or vomiting blood or vomit that looks like coffee grounds. While some bleeding, such as a nosebleed, may not seem like much of a concern, you should notify your healthcare team right away if you develop bleeding of any sort.

#### Fatigue

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Fatigue is very common during cancer treatment and is an overwhelming feeling of exhaustion that is not usually relieved by rest. While on cancer treatment, and for a period after, you may need to adjust your schedule to manage fatigue. Plan times to rest during the day and conserve energy for more important activities. Exercise can help combat fatigue; a simple daily walk with a friend can help. Talk to your healthcare team for helpful tips on dealing with this side effect.

**Electrolyte Abnormalities**
This medication can affect the normal levels of electrolytes (sodium, potassium, magnesium, calcium, etc.) in your body. Your levels will be monitored using blood tests. If your levels become too low, your care team may prescribe specific electrolytes to be given by IV or taken by mouth. Do not take any supplements without first consulting with your care team.

**High Blood Pressure**
This medication can cause high blood pressure (hypertension). Patients should have their blood pressure checked regularly during therapy. Any hypertension should be treated appropriately. If hypertension cannot be controlled, the medication may be stopped. Report any headaches, vision changes or dizziness to your oncology care team.

**Peripheral Edema**
Peripheral edema is swelling of the extremities caused by retention of fluid. It can cause swelling of the hands, arms, legs, ankles and feet. The swelling can become uncomfortable. Notify your oncology care team if you are experiencing any new or worsening swelling.

**Low White Blood Cell Count (Leukopenia or Neutropenia)**
White blood cells (WBC) are important for fighting infection. While receiving treatment, your WBC count can drop, putting you at a higher risk of getting an infection. You should let your doctor or nurse know right away if you have a fever (temperature greater than 100.4°F or 38°C), sore throat or cold, shortness of breath, cough, burning with urination, or a sore that doesn’t heal.

**Tips to preventing infection:**
- **Washing hands**, both yours and your visitors, is the best way to prevent the spread of infection.
- Avoid large crowds and people who are sick (i.e.: those who have a cold, fever or cough or live with someone with these symptoms).
- When working in your yard, wear protective clothing including long pants and gloves.
- Do not handle pet waste.
- Keep all cuts or scratches clean.
- Shower or bath daily and perform frequent mouth care.
- Do not cut cuticles or ingrown nails. You may wear nail polish, but not fake nails.
- Ask your oncology care team before scheduling dental appointments or procedures.
- Ask your oncology care team before you, or someone you live with, has any vaccinations.

**Decrease in Appetite**
Nutrition is an important part of your care. Cancer treatment can affect your appetite and, in some cases, the side effects of treatment can make eating difficult. Ask your oncology care team about nutritional counseling services at your treatment center to help with food choices.

- Try to eat five or six small meals or snacks throughout the day, instead of 3 larger meals.
- If you are not eating enough, nutritional supplements may help.
- You may experience a metallic taste or find that food has no taste at all. You may dislike foods or beverages that you liked before receiving cancer treatment. These symptoms can last for several months or longer after treatment ends.
- Avoid any food that you think smells or tastes bad. If red meat is a problem, eat chicken, turkey, eggs, dairy products and fish without a strong smell. Sometimes cold food has less of an odor.
- Add extra flavor to meat or fish by marinating it in sweet juices, sweet and sour sauce or dressings. Use seasonings like basil, oregano or rosemary to add flavor. Bacon, ham and onion can add flavor to vegetables.

**Proteinuria**
This medication can cause an increase in the amounts of protein in your urine. Your healthcare team will monitor your kidney function and protein in your urine throughout treatment with this medication.

**Less common, but important side effects can include:**

- **GI Tear:** This medication can cause a tear in the intestinal wall. Symptoms include: unexpected bleeding, blood in the stool or black stools, coughing up blood, vomiting blood, vomit that looks like coffee grounds, fever, severe pain in the abdomen or new abdominal swelling. If you experience any of these, contact your oncology care team immediately or go to the emergency room.

- **Wound Healing:** This medication can lead to slower or incomplete wound healing, such as a surgical wound not healing or staying closed. Be sure to inform the team performing the surgical procedure that you are taking ramucirumab. You should also inform your oncology team that a surgical procedure is planned. It is recommended that this medication be discontinued prior to any surgery. The medication should not be restarted for at least 2 weeks after surgery. Any surgical incision should be fully healed prior to starting or restarting the medication. If you have a surgical wound that has not healed or begins to have signs of infection (redness, swelling, warmth), report this to your healthcare team.

- **Posterior Reversible Encephalopathy Syndrome (PRES):** In rare cases this medication has caused a neurological disorder called posterior reversible encephalopathy syndrome (PRES), also called reversible posterior leukoencephalopathy (RPLS). Symptoms of PRES/RPLS include headache, seizure, lethargy, confusion, blindness and other visual and neurological disturbances. Report any of these symptoms to your healthcare team immediately.

- **Blood Clots, Heart Attack and Stroke:** This medication can increase the risk of blood clots, stroke and heart attack. Symptoms can include: swelling, redness or pain in an extremity, chest pain or pressure, pain in your arm, back, neck or jaw, shortness of breath, numbness or weakness on one side of the body, trouble talking, confusion or mental status changes. If you experience any of these symptoms, you should contact your oncology care team immediately or go to an emergency room.

- **Infusion Reaction:** The infusion can cause a reaction that may lead to chills, fever, low blood pressure, nausea and vomiting. You will receive Tylenol and diphenhydramine prior to the infusion to help prevent these reactions. Reactions are most common during the first week of therapy, including the evening after the infusion. Your oncology care team will tell you what to do if this happens.

- **Thyroid Problems:** This medication can cause hypothyroidism (under active thyroid) and hyperthyroidism (over active thyroid). Your healthcare provider will perform blood tests to check the function of your thyroid and treat this side effect if it develops. Symptoms of thyroid problems include: tiredness, feeling hot or cold, change in your voice, weight gain or loss, hair loss and muscle cramps. Report any of these symptoms to your oncology care team.

**Reproductive Concerns**

Exposure of an unborn child to this medication could cause birth defects, so you should not become pregnant or father a child while on this medication. Effective birth control is necessary during treatment and for at least 3 months after treatment. Even if your menstrual cycle stops or you believe you are not producing sperm, you could still be fertile and conceive. You should consult with your healthcare team before breastfeeding while receiving this medication. Ramucirumab may impair fertility in women with reproductive potential. Talk to your provider about these risks.