When most people hear the word leech they cringe; however, an increasing amount of people are experiencing the benefits of a particular species of leech known as *Hirudo medicinalis*. Leeches have been used in the treatment of various ailments for centuries. In the past doctors believed leeches could cure just about everything, because doctors believed illnesses were caused by “bad blood”. Therefore, the doctors would use leeches to treat patients so the “bad blood” could be removed (Slimy bloodsuckers). Doctors now know that not everything can be treated by bloodletting; however, leeches have not lost their importance in the world of medicine. Today leeches are used by surgeons who perform reconstructive procedures. They are also used to treat various diseases. Their saliva helps to prevent clotting and increases blood flow as well. *Hirudo medicinalis* should be considered an endangered species and protected by the scientific community because of its importance in the treatment of diseases, their use in surgeries, and the use of their saliva in the world of medicine. *Hirudo medicinalis* is used in the treatment of diseases, such as arthritis. A leech can be used to treat arthritis because of the unique properties of its saliva. For the treatment of arthritis the leech is applied to the location of the pain and allowed to feed until it is full. When it is full it falls off and the treatment is complete. This method is called leech therapy, and it is becoming more popular. A positive feature of leech therapy is its low amounts of treatments. It is only required once every six to eight months as opposed to every month that traditional treatment...
methods call for, such as a cortisone shot. Leech therapy has no harmful side effects, and effects of the therapy can last for up to six months. (Arizona Leech Therapy). Scientists are working to create a mechanical leech, but so far nothing has worked as well as the real thing. In the future it is hoped that a synthetic leech will be developed because some patients cannot stand the idea of a leech being placed on their bodies (Slimy bloodsuckers). Leeches’ saliva have healing components that help the inflammation in arthritis decrease making leech therapy in arthritis an excellent treatment and reason this leech should be protected.

_Hirudo medicinalis_ treats more than arthritis, they also have been known to treat people with hypertension. Hypertension is defined as a high blood pressure and a leech can help to normalize the blood pressure by thinning the blood and breaking up any clots that may form in the blood of an individual. Since hypertension patients are more susceptible to strokes, leech therapy can act as a prevention method (Arizona Leech Therapy). Hypertension is a common ailment of the general public and methods to decrease this health concern are constant. Using leeches to break up clots and thin blood is a non-invasive strategy that is inexpensive. This simple strategy for addressing a common issue, hypertension, is worth pondering when considering the preservation of this little leech.

Of course, as with everything else, leech therapy can have drawbacks. With the use of leeches there is a very slight risk of serious infection; however the chance of that happening is very small. Even if a person became infected from a leech, doctors have antibiotics that can cure the infection. Therefore infection is not something that a person receiving leech therapy needs to worry about very much. The other slight risk of leech therapy is the fact that a leech is a creature that is alive, and therefore they can move. Sometimes a leech will slip off the area it is supposed to be treating, and reattach itself on an area that does not need to receive treatment. However, a
team of surgeons from Miami have come up with a way to limit the movement of leeches during a treatment. The proposed solution to the issue of leech movement is simple; the doctors would place a surgical suture on one end of the leech and tie the other end to a firm object, such as a wound dressing. This method would significantly decrease the risk of leech movement to unwanted places (Simple technique). Scientists are working diligently to resolve patient discomfort of having a living creature on their skin during leech therapy the only apparent negative of the treatment. While there is always a drawback to medicine and various treatments this leech would offer more positives to the medical world than negatives making it an invaluable asset requiring placement on the endangered species list.

*Hirudo medicinalis* are also used in certain reconstructive surgeries, such as the reattachment of ears, fingers and the tips of noses. They are used in those particular surgeries because of their ability to help the minute veins in those areas regrow. This is helpful because if the veins do not grow back together the tissues would die and the reattachment would be a failure. *Hirudo medicinalis* also helps restore circulation to an area that has been deprived of blood for an extended period of time (*Slimy bloodsuckers*). This particular effect of leeches is beneficial because for many surgeries blood flow is cut off from the area by a tourniquet. The leeches aid in blood circulation preventing blood clots, thereby promote growth in tissues. Stimulation of growth at reconstructive areas is an essential component of the surgery’s success made possible through *Hirudo medicinalis*’ unique abilities, yet another reason this leech should be protected by the science world.

These leeches can also assist doctors who use skin grafts on their patients. A skin graft is when surgeons take skin from their patient in an unnoticeable spot to place it in an area where the skin that had been there was damaged. Skin grafts are commonly used on burn victims and...
people who have experienced severe trauma. Skin grafts do not always have to be from the patients themselves, they can also be synthetic. When either type of skin graft is applied to an area, blood will pool under the new skin. When that happens the skin graft will not take, therefore the doctors will use a leech to remove the pooled blood. Leeches do more than just remove excess blood from the area under the skin graft though; they also quicken the healing process (Slimy bloodsuckers). The use of *Hirudo medicinalis* on skin grafts allows the area to receive more blood flow, which allows the skin graft to heal faster. Skin grafts are so important to burn victims that are trying to move past their trauma and assimilate back into society, which would not be as easy if cosmetically the victims were unpleasing. Leeches are one factor that assures skin grafts are accepted by the patient’s body. Burn victims as well as other types of skin graft patients would benefit immensely from maintaining *Hirudo medicinalis* as protected thereby ensuring the leech’s ability to aid in the common medical practice of skin grafting.

Another medically important use of *Hirudo medicinalis* is the components of its saliva which contains several bioactive molecules and compounds. Their saliva contains eight known substances that are useful to doctors including: hirudin, hyaluronidase, calin, destabilase, apyrase, eglin, bdellin, and hirustasin (Jameel). One of the eight substances is hirudin, can be used as an alternative to heparin. Heparin is an anticoagulant that was created in a lab, and has been known to cause severe side effects in some patients. The administration of hirudin has exhibited no side effects in the patients it was used on; however, the use of heparin in some patients produces an allergic reaction (Hirudin). People born with an antithrombin III deficiency cannot receive heparin as an anticoagulant, so for them hirudin would be a good option. This is just one way the saliva is useful in medicine.
Hyaluronidase is an enzyme that allows tissues to receive fluids easier and is located in the leech’s saliva. This enzyme allows for the reabsorption of blood into the tissues, and it allows the anesthesia in leech saliva to be accepted. Hyaluronidase is also a powerful antibiotic. For those reasons hyaluronidase is being considered for addition to chemotherapy drugs (Jameel). In a world where current antibiotics are become ineffective due to over use, finding new antibiotics to fight bacteria is essential. The battle against cancer and push for findings treatments are also endless. Hirudin and hyaluronidase are two substances in the saliva of *Hirudo medicinalis*, that address both of these concerns making this animal worth protecting.

There are several other substances in there saliva, but the substances medical uses are less developed. One of these substances includes calin, which is another anticoagulant that affects collagen. Collagen is known as the glue of the human body, because it strengthens blood vessels. This means that it does not let a clot form in the blood of the patient. Destabilase, a lysozyme, possesses the ability to dissolve blood clots. Apyrase is a substance that prevents blood clots. *Hirudo medicinalis* has two apyrases that have been found in their saliva. Eglin is a protein that reduces inflammation. Bdellin is used to control bleeding and can also be used as an anti-inflammatory. Hirustasin is a protein that prevents blood coagulation (Jameel). While there are other medical methods that accomplish most of these additional enzyme’s functions, there is an indication that the saliva could contain unknown enzymes that could potentially be beneficial. To ensure these potential enzymes are present for study the actual leech needs to be protected.

Overall the effects that *Hirudo medicinalis* has on people are overwhelmingly positive. Unfortunately, the amount of *Hirudo medicinalis* left in the wild has decreased dramatically because of people who believe they are pests and take it upon themselves to get rid of them. Pollution has also had an effect on leeches because some of the water they live in has become...
due to chemical runoff from factories. Placing *Hirudo medicinalis* on the endangered species list would help to keep them safe from people who wish to harm them. If this leech is placed on the endangered species list it would not be legal to have toxic chemicals around the bodies of water in which they live. This act alone could benefit thousands of people who require the use of a leech. One reason they should be protected is that they can treat certain diseases such as arthritis and hypertension. Another is that they are used during reconstructive surgeries to prevent blood clots. Their saliva is also being used in many different ways in the medical world primarily due to the presence of hirudin and hyaluronidase in the saliva. *Hirudo medicinalis* is vital to the medical community due to their use as disease treatment, their use in reconstructive surgeries, and unique saliva enzymes; therefore, *Hirudo medicinalis* should be placed on the endangered species list.


Comment: The titles for references say works cited. It is not underlined, in italics, or quotes. Both words are capitalized.