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EMPLOYEE-OWNED

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Regenerative Medicine

Regenerative medicine is a field that focuses on replacing, repairing, or creating new tissues in the body. Goals for our companion animals are to reduce pain, help regenerate injured tissue, and return a joint, muscle, or tendon to its normal function. The most common techniques used in clinical medicine for pets are platelet-rich plasma and stem cell therapy. There is a lot of research in progress with regenerative medicine, especially in human medicine, so recommendations and indications will change as we learn more.

Platelet-Rich Plasma (PRP)
VSC surgeons have been using platelet-rich plasma (PRP) for over 15 years. Our orthopedic patients' most common PRP indications include chronic, non-healing injuries to muscle, tendon, and bone, as well as osteoarthritis.

Platelets are one of the blood cells that occur naturally in the body. The platelets have several functions. Their primary function is in the development of blood clots that prevent excessive bleeding after trauma. Following the formation of a blood clot, the platelets release growth factors involved in the repair process. The platelet-derived growth factors recruit other cells that help reduce inflammation and promote the healing of tissues.

Platelet-rich plasma (PRP) therapy is performed by obtaining a blood sample from the patient. The patient's blood is then processed to remove the red and white blood cells, leaving a solution containing concentrated platelets and plasma (the fluid potion of the blood). This process takes approximately 1 hour. The PRP is then divided into multiple doses for administration. Some of the PRP is frozen for future use. It can be stored up to 90 days.

Once the PRP is collected and processed, the regions of injury or osteoarthritis are injected with PRP. In many cases, sedation is required to facilitate the injection. The radiologist can guide the injection with ultrasound in situations where specific regions of muscle or tendon require precise administration.

The side effects of PRP therapy are minimal and infrequent. Since the body's own cells are being processed and injected using a sterile technique, allergic or infectious side effects are rare. In most situations, side effects are limited to discomfort and occasional bruising at the injection site.

The most common problems that we treat (or supplement) with PRP include:

- ✓ Osteoarthritis (hip, elbow, stifle, tarsus, carpus or shoulder)
- ✓ Medial shoulder instability
- ✓ Biceps tendinopathy
- ✓ Supraspinatus tendinopathy
- ✓ Achilles (calcaneal) tendon injury

Each indication of PRP therapy may have a different protocol for injections. In most situations, the outcome is optimized using multiple injections, and we typically administer three injections at 3-week intervals. PRP therapy is often combined with other treatments like rehabilitation therapy, surgery, or immobilization techniques.

The benefit of PRP therapy has been documented with small studies of dogs with certain conditions, but the literature is sparse on the actual effectiveness in all situations. Most of our recommendations are based on our experience and the experience of others who utilize regenerative therapies frequently.

Stem Cell Therapy

Stem cells are responsible for creating all the different tissues in the body as a fetus, and continue to maintain those tissues through adulthood. There are three main types of stem cells: embryonic stem cells, adult stem cells, and fetal stem cells. As an adult, our stem cells are found throughout the body, and help in the healing process.

Mesenchymal stem cells (MSC) are most commonly isolated from adult bone marrow or fat, and do not retain the ability to form all types of tissue in the body like embryonic stem cells. However, MSC can divide quickly and become bone, cartilage, or tendon, making MSCs an excellent choice for orthopedic medicine. Stem cell therapy involves the isolation of adult stem cells and the administration of these cells into areas of injury and chronic inflammation (e.g. joints, soft tissues, and organs). After administration, the stem cells can grow and proliferate. They produce substances that help to promote healing and modulate inflammation.

Indications

The predominant application for regenerative stem cell therapy is for the alleviation of pain secondary to osteoarthritis in dogs and cats.

Other reported uses include: inflammatory bowel disease, chronic hepatitis or chronic pancreatitis, tendon and ligament injury, immune-mediated polyarthritis

Patients are good candidates for stem cell therapy if medical treatment (such as nonsteroidal anti-inflammatories) or orthopedic surgery are not viable options due to concurrent illnesses. Cancer, infection, and steroid therapy are all contraindications to stem cell therapy. While harvesting of MSC requires general anesthesia and a small incision, it is a rapid procedure and most patients will be discharged the same day.

We strongly recommend that patients undergoing regenerative stem cell therapy for arthritis care also be involved in our multi-modal approach to the long-term management of osteoarthritis. This includes:

- ✓ Dietary and weight management
- ✓ Chondroprotective supplements (oral and injectable)
- ✓ Pain management
- ✓ Exercise management
- ✓ Rehabilitation (underwater treadmill, cold laser therapy)

Results are varied per patient, and research is too sparse at this point to draw any statistically significant conclusions at this time. Most owners see an improvement in their dogs' quality of life in 1-2 months, and activity level is reported to be improved. In many cases, adjunctive medical therapies such as NSAIDs can be reduced or even discontinued. Additional treatments can be frozen and saved, and repeated in the future if so desired. This eliminates the need for general anesthesia as the pet ages.