

Regenerative Medicine

Presented by

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and

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What is Regenerative Medicine?

Treatments using the body's own cells to replace, regenerate or rejuvenate tissues, tendons, ligaments or other bodily elements back to their normal function following injury.

What's the Difference Between Traditional Treatments & Regenerative Treatments?

Traditional methods focus more on relieving pain and controlling symptoms of the injury.

Regenerative Medical Focus

Regenerative medicine is aimed at fixing the root cause and restoring the body to its normal function.

Regenerative Medicine Modalities

- “ PRP – Platelet Rich Plasma
- “ IRAP (Interleukin-1 Receptor Antagonist Protein)
- “ Stem Cell Therapy
- “ Laser Therapy

PRP – Platelet Rich Plasma

This therapy uses platelets from the patient's own blood to regenerate tissues, tendons, and more!

How platelets are obtained

- “ Blood is drawn from the patient (52 mls)
- “ Plasma containing the platelets is separated out from red & white blood cells by spinning the whole blood in a centrifuge
- “ Plasma is then injected into the injured area to promote healing

Method of Healing with PRP

Platelets are the smallest of all blood cells and are responsible for the clotting mechanism. The platelets contain a concentrated amount of growth factors and other proteins that help to stimulate tissue regrowth and promote the healing of the injured area.

PRP Growth Factors

Growth factors enhance healing by:

- “ Creating flow of additional inflammatory cells to the injured area
- “ Help formation of new blood vessels
- “ Help formation of new connective tissue
 - “ Help regeneration of skin

Main Uses of PRP therapy

Compromised

- “ Joints
- “ Tendons
- “ Ligaments

PRP Complications & Cost

Complications are rare with PRP Therapy because treatments involve the use of the horse's own body fluids.

Since the therapy is a very simple process, the costs are very reasonable.

PRP & Traditional Medicine

Combined Effort

- “ PRP
- “ Rest
- “ Anti-inflammatory medication
- “ Cold hosing and icing

IRAP

Interleukin-1 Receptor Antagonist Protein

Say What!

Okay...take a breath,
maybe we start with what the intended
purpose of IRAP is before trying to explain
what it is.

i Rap



Okay – Not This !!
Just making sure you were paying
attention !!



Okay, not that either !!

Getting serious now....REALLY !!!

IRAP's Purpose

When an injury occurs, inflammatory interleukin-1 (IL-1) flows to the injured area accelerating tissue destruction causing joint pain, inflammation and eventually cartilage damage.

The IRAP treatment helps to block the destructive effects of the increase in IL-1 after an injury occurs.

IRAP's Magic

IRAP works by preventing IL-1 from binding to the IL-1 receptors in the joint and therefore blocks the damage and inflammation caused by IL-1.

IRAP

What is the Process?

- “ Vet draws 50 ml of blood from the horse into a specialized syringe with glass beads that stimulate production of an antagonist protein (IRAP)
- “ The blood incubates for 24 hours
- “ The plasma rich in the antagonist protein (IRAP) is separated from the blood using a centrifuge
- “ IRAP is then injected into the joint once every 7-10 days for 3-5 treatments.



Most Common Uses of IRAP

- “ Mainly Joints
- “ Knees with Bone Chips
- “ Some new use with Soft Tissue Damage

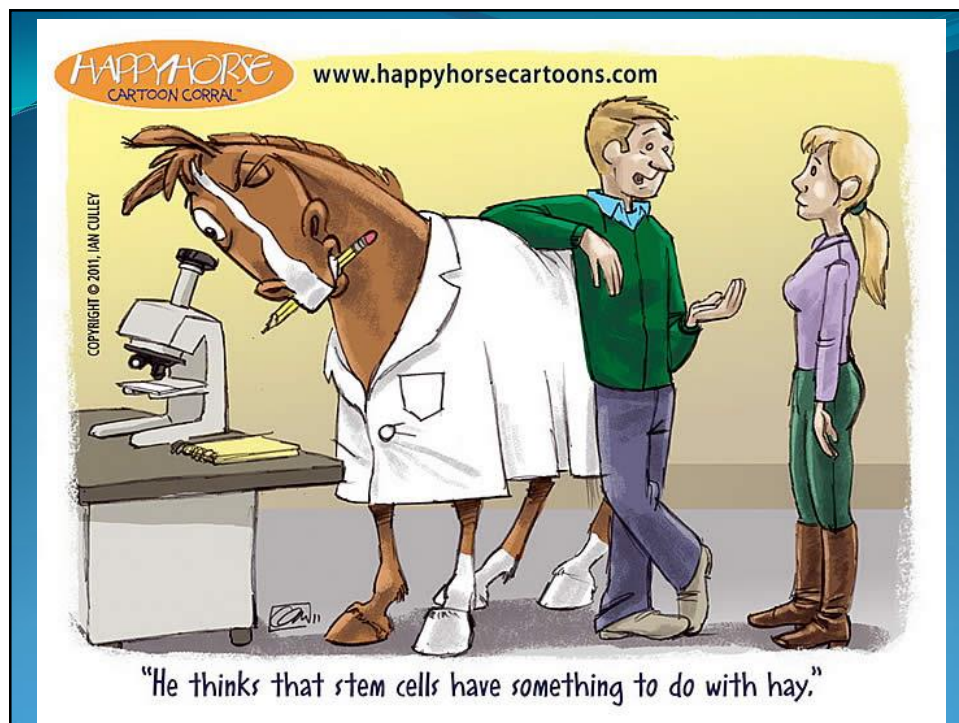
Side Effects & Costs of IRAP

Since the IRAP System uses the animal's own blood, the treatment carries little or no side effects.

Although more than PRP treatments, IRAP still provides a relatively low cost especially when you consider costs of anti-inflammatory medicine and the possible side effect of medicine over an extended period of time.

Stem Cell Therapy

Stem cells are obtained from the injured horse's bone marrow or fat and are then separated and cultured and then injected into the affected injury location to encourage the healing process.



Stem Cells

The Science Behind It

Stem cells are young cells that have not become specialized to serve a specific purpose or perform a certain function.

Stem Cell Differentiation

Since stem cells have not become specialized yet (or Differentiated), they can technically become any type of body tissue.

The veterinarian utilizes this fact to replace or regenerate the damaged cells, tissues or organs to re-establish normal function after an injury.

Two Types of Stem Cells

Embryonic

Adult

Embryonic

Embryonic stem cells are able to become any type of cell in the body.

Problem:

We are typically not storing umbilical chords or have an embryo available; and if we were the cost would be prohibitive, not to mention the moral controversy.

So...this type of stem cell is generally not available.

Adult – Stem Cells

Two Types of Adult Stem Cells

Hematopoietic

Mesenchymal

Hematopoietic

This type of stem cell turns into various types of blood (like red blood cells), so we are not going to concentrate on this type of stem cell.....

We are interested in.....

Mesenchymal

This type of stem cell can turn into
connective tissue (bone, muscle, tendon, etc.)

....and therefore.....,

is the type used in humans, horses, dogs and cats to
help heal and regenerate healthy tissue.

Sources of Adult Stem Cells

Most commonly the source for these cells are:

Bone Marrow

Adipose Tissue (Fat)

Choice of Stem Cells

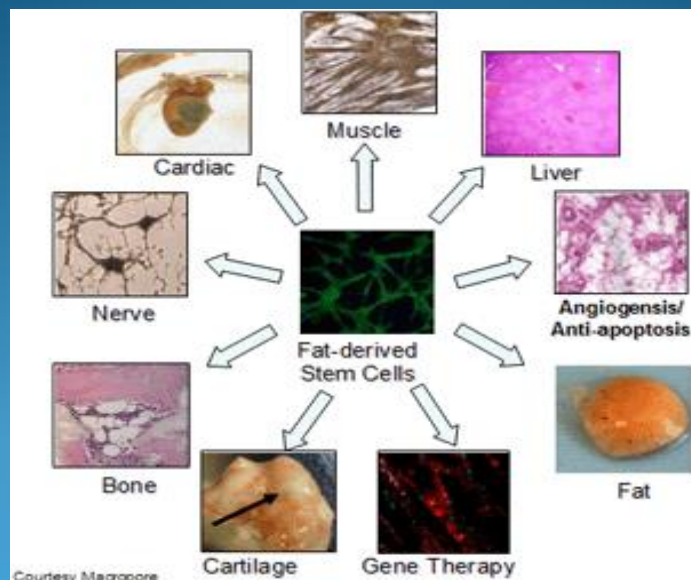
The best choice for stem cell collection is from Adipose Tissue or Fat.

Why, you ask?

Stems Cells Collected from Fat

- “ Provide a readily available source
- “ Can be collected in far greater concentrations than those from bone marrow
- “ Cells are able to differentiate into multiple lineages
- “ In addition to the stem cells, the fat tissue also has a mixture of blood vessel creating cells, immune cells to fight infection, fibroblasts to help create new connective tissue and other growth factor cells to promote healing and regeneration.

Fat Derived Stem Cells



Obtaining the Sample

The usual collection area is the tailhead, where there is a large fat pad.

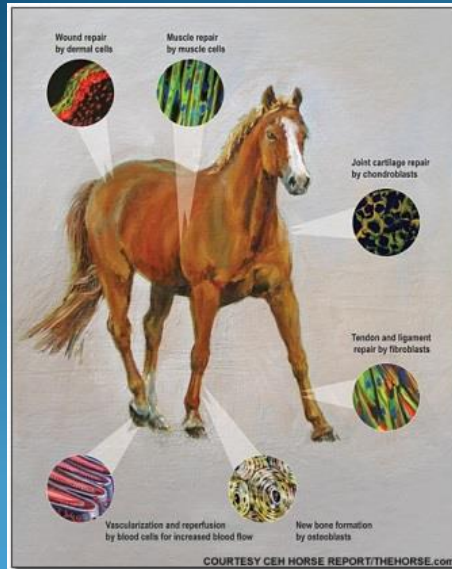
Vet makes a small incision and collects approximately 2 tablespoons of fat.

Preparing the Sample

The sample is then shipped to the laboratory, purified and concentrated and placed in a syringe for injection and then shipped back to the veterinarian. The processing time is a matter of days.

Extra product can be stored (frozen) at the lab!

Typical Treatment Areas



- “ Tendons
- “ Ligaments
- “ Joints
- “ Bone
- “ Hoof Growth
- “ Arthritis

Timing of Treatments

For the most beneficial results, treatment should begin within a month of the injury, Before scar tissue becomes established.

Delayed treatment can have a beneficial result; however, after a month's time the body is already starting to mend.

Recovery

Joint Disease – improvement within days to weeks

Tendon and Ligament – improvement within 45 days

Fractures – heal twice as fast

Regular light exercise is recommended.

Can use Bute during recovery,
but steroids will hinder the healing process !

Recovery - continued

Total length of recovery may not necessarily be any faster with stem cell therapy, but the area of concern will be much stronger since it is being reguvenated rather than just healed.

Cost & Side Effects

Cost typically is between \$1000 to \$3000

As with IRAP and PRP, there are few side effects since the treatment is derived from the horse's own cells.

Laser Therapy

Dissimilar to the previously shown therapies of IRAP, PRP and Stem Cell Therapy in that there is no sample extracted from the horse.....

Similar in nature in that.....

Laser Therapy does use the horse's own body to help heal itself.

How Low Level Light Therapy Works

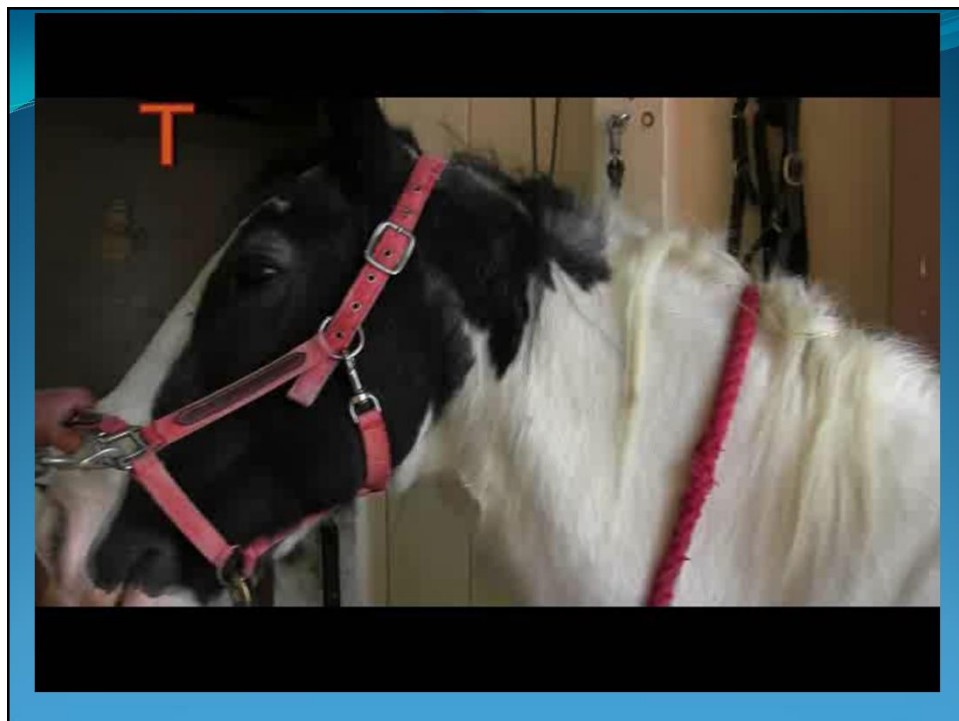
Specific wavelengths of light in accurately measured doses provide immune responses in the animal's blood giving anti-inflammatory and immune stimulation effects.

What is Low Level

This type of laser is the non-cutting variety.

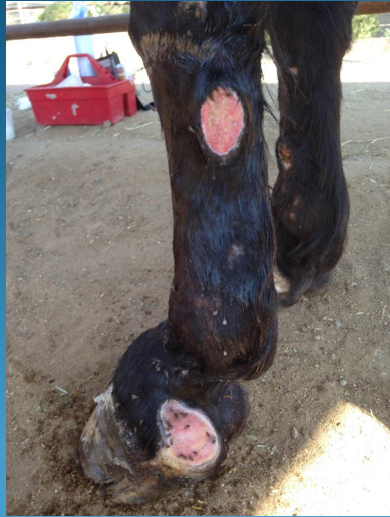
It is:
Painless
Sterile
Non-Invasive
Drug Free

Here's what the treatment looks like !!

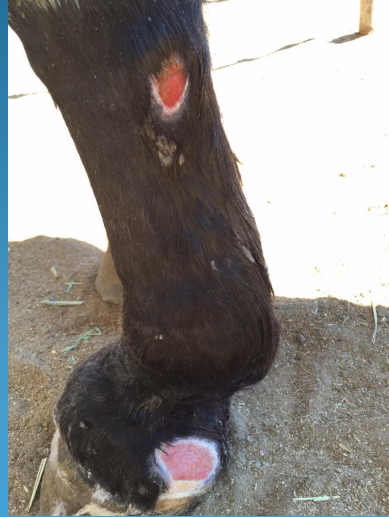


Fly Strike Wound

Before Laser Therapy



After Several Laser Treatments



Conclusion

- “ Can be used in conjunction with traditional treatments or
- “ Can be a drug-free option
- “ Tolerated very well by animal – ↓ side effects
- “ Can rebuild the body back to its original function
- “ Can decrease healing time
- “ Provides an alternative to traditional methods
- “ Relatively simple to administer
- “ Range of costs

Thank you

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Joan Fry
Vet Stem Inc
American Horse Daily
TheHorse.com
EquineStemCells.Weebly.com
Arthrex Vet Systems
PRPTreatments.org
Grady Medical
Jim Schmitt

Thank you for joining us tonight !!