

## Stemming the Tide of CCL?

Interest in adjunctive treatments for canine cranial cruciate ligament (CCL) tears is driven by lack of ideal long-term surgical outcomes. One promising new approach is mesenchymal stem cell (MSC) therapy. MSCs accelerated healing of transected ligaments in animal models. Fresh, whole bone marrow cells (BMCs) may have greater effects because of their ability to differentiate into the target tissue type. BMCs would also be more practical clinically. This study evaluated the engraftment potential of autologous BMCs injected intra-articularly in dogs with natural CCL tears and examined whether PKH26 red fluorescent dye labeling is a safe, effective way to track canine BMCs.

Bone marrow was harvested from 7 client-owned dogs presenting for surgical CCL repair. Cells were labeled with PKH26 and, following synovial fluid aspiration, injected into the stifle. Detection rate remained low, however, with labeled cells found in 3/7 dogs and small numbers of engrafted cells in these cases. Future studies should address whether injection of higher numbers of BMCs is safe and more effective. Although the clinical procedure tested was practical and safe, results

imply that application of MSCs may prove superior to BMCs for engraftment and cell tracking after PKH26 labeling.

### Commentary

The use of stem cells has gained widespread attention with clinical uses from cardiovascular disease to arthritis. Although researchers have investigated source, dose, viability of cells, and effects in various diseases, prospective studies documenting efficacy in canine orthopedic disease are lacking. This study tracked stem cells delivered into canine stifles and found that a small number of cells did engraft on the injured CCL. Future studies could explore the use of stem cells in cases of partial CCL tears in which force plate and gait analysis could be used to measure improvement.—*Brenda Salinardi, DVM, MS, DACVS*

### Source

Linon E, Spreng D, Rytz U, Forterre S. Engraftment of autologous bone marrow cells into the injured cranial cruciate ligament in dogs. *VET J* 2014;202(3):448-454.

## Optimal Gastric Acid Suppression in Dogs

In critically ill dogs, GI bleeding is a common complication with many causes, including NSAID toxicosis, liver failure, and GI neoplasia. Treatment includes acid-suppressant administration to increase the gastric pH. Famotidine works within hours compared to a proton pump inhibitor (PPI) such as pantoprazole, which takes several days to reach peak effect. Many veterinarians administer the rapidly acting famotidine in the first few days in combination with the slower-acting pantoprazole to critically ill dogs with high risk for GI bleeding, but there is no evidence demonstrating an advantage with this combination. Many pharmacologists argue that combination therapy may interfere with the efficacy of the PPI. In this randomized crossover study, gastric pH changes over a 3-day period were compared in healthy dogs ( $n = 12$ ) given IV famotidine with pantoprazole or pantoprazole alone. All treatments were dosed at 1 mg/kg IV q12h for 3 days, and continuous intragastric pH monitoring was performed. In humans, mean percentage time (MPT) intragastric pH  $\geq 3$  is the ideal baseline for GI ulceration healing; MPT  $\geq 4$  is ideal for healing of gastroesophageal reflux lesions. No significant differences were found between the MPT that gastric pH was  $\geq 3$  and  $\geq 4$  between the 2 groups in this study. The monotherapy group also remained above target pH levels

for longer periods than the combination-therapy group. There appears to be no advantage to giving famotidine in addition to pantoprazole for increasing gastric pH.

### Commentary

PPIs such as pantoprazole reach peak effect after 4 days of therapy, which is why many veterinarians co-administer famotidine during the first several days of treatment. The work presented here shows that there is no difference in acid suppression between PPI monotherapy and combined treatment with pantoprazole and famotidine. Practitioners are also reminded that previous research has shown that q12h PPI administration can provide superior acid suppression compared to q24h dosing. This research adds to what is known about optimal acid suppression therapy in dogs, moving our profession toward an understanding of how to best treat dogs with GI bleeding.—*Julie M. Walker, DVM, DACVECC*

### Source

Tolbert MK, Odunayo A, Howell RS, Peters EE, Reed A. Efficacy of intravenous administration of combined acid suppressants in healthy dogs. *JVIM*. 2015; 29(2):556-560.

continues