

## Research Article

# Systemic C-Reactive Protein Reduction Following Jugular-Applied Coherent Low-Level Laser Therapy

Travis Sammons<sup>1\*</sup>, David Huff<sup>2</sup> and Iliana Sosa Teste<sup>3</sup>

<sup>1</sup>Clinical Affairs Manager, Erchonia Corporation, USA

<sup>2</sup>Practicing Veterinarian, Plantation Park Animal Hospital, USA

<sup>3</sup>Researcher and Full Professor, National Center for Laboratory Animal Production (CENPALAB), Cuba

### Abstract

This study evaluated the anti-inflammatory effects of jugular-applied coherent low-level laser therapy (LLLT) in geriatric dogs with chronic arthritis. Ten Beagles were randomized to receive either a 20-minute session of coherent 640 nm red LLLT or placebo handling without laser emission. Serum C-reactive protein (CRP) was measured before and 24 hours after treatment. The LLLT group showed a significant reduction in CRP ( $-3.06$  mg/L,  $p = 0.038$ ), while the placebo group showed no significant change ( $-0.18$  mg/L,  $p = 0.29$ ). Between-group comparison approached significance ( $p = 0.074$ ) with a large effect size (Cohen's  $d = -1.80$ ). These results suggest that coherent LLLT applied over the jugular vein may reduce systemic inflammation, offering a non-pharmacologic alternative to manage chronic inflammatory conditions.

**Keywords:** Anti-inflammation; Low-level laser therapy; C-reactive protein

### Introduction

C-reactive protein (CRP) is a highly sensitive acute-phase reactant and established biomarker of systemic inflammation. Elevated CRP is associated with a wide range of inflammatory and degenerative conditions in both human and veterinary medicine [1]. In canine arthritis, persistent inflammation contributes to joint degeneration, pain, and impaired mobility.

**\*Corresponding author:** Travis M. Sammons, Clinical Affairs Manager, Erchonia Corporation, USA. Tel: +1 888-242-0571, E-mail: tsammons@erchonia.com

**Citation:** Sammons T, Huff D, Teste IS (2025) Systemic C-Reactive Protein Reduction Following Jugular-Applied Coherent Low-Level Laser Therapy. J Anim Res Vet Sci 9: 067.

**Received:** August 18, 2025; **Accepted:** August 29, 2025; **Published:** September 05, 2025

**Copyright:** © 2025 Sammons T. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Low-level laser therapy (LLLT) has demonstrated anti-inflammatory and analgesic effects in both preclinical and clinical models [2]. However, the systemic impact of jugular-applied LLLT on circulating CRP levels—particularly using a coherent light configuration over the jugular—has not been previously studied. This study investigates the effect of a single jugular LLLT session on venous CRP concentration 24 hours post-treatment, using a placebo-controlled design in aged Beagles with chronic arthritic symptoms.

### Materials and Methods

Procedures were performed at the National Center for Laboratory Animal Production (CENPALAB). Ten geriatric Beagle dogs (mean age: 11.6 years) diagnosed with chronic arthritis were enrolled and randomly assigned to two groups. The first group ( $n = 5$ ) received active 640 nm red coherent laser therapy (Erchonia Corp.) applied over the jugular vein for a duration of 20 minutes. The second group ( $n = 5$ ) served as a placebo control and underwent identical handling without laser emission. Venous blood samples were collected from the jugular vein at baseline (Pre) and again 24 hours post-intervention (Post). Serum C-reactive protein (CRP) concentrations were measured using a validated, canine-specific high-sensitivity immunoturbidimetric assay.

### Statistical Analysis

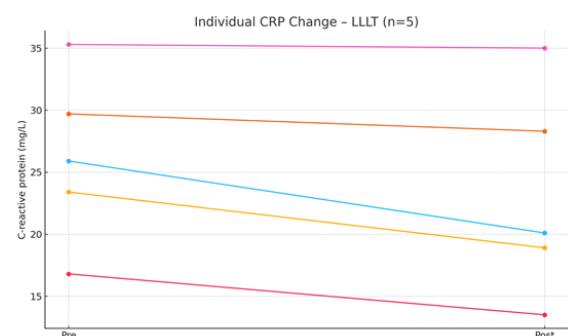
Paired Student t-tests were conducted for Pre vs Post within each group. Between-group comparison of the difference ( $\Delta = \text{Post} - \text{Pre}$ ) employed the Mann-Whitney U test. Effect size was estimated with Cohen  $d$  ( $d = -1.80$ ). Significance threshold:  $\alpha = 0.05$  (Table 1 & Figures 1-3).

### Results

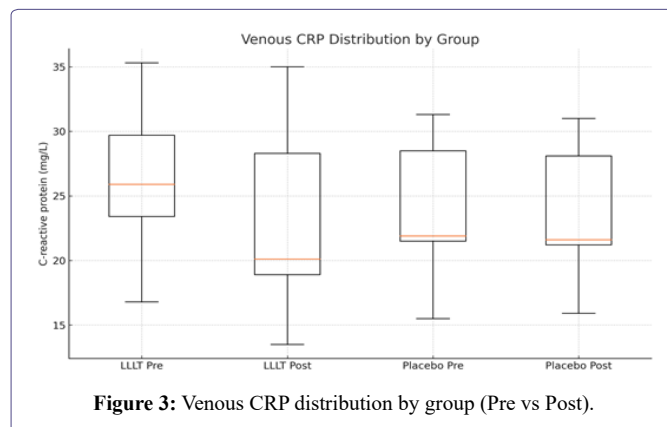
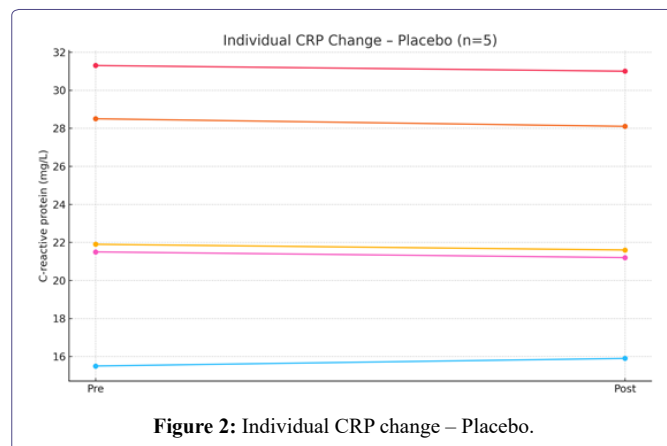
Group	n	Mean Pre	SD Pre	Mean Post	SD Post	Mean $\Delta$	SD $\Delta$	p Pre vs Post
LLLT	5.00	26.22	6.92	23.16	8.48	-3.06	2.24	0.04
Placebo	5.00	23.74	6.25	23.56	6.00	-0.18	0.33	0.29

**Table 1:** Changes in Serum C-Reactive Protein (CRP) Pre- and 24 Hours Post-Intervention in LLLT and Placebo Groups

Between-group test on  $\Delta$ : Mann-Whitney U test = 3.50,  $p = 0.074$ . Average CRP reduction in LLLT:  $-3.06$  mg/L; in placebo:  $-0.18$  mg/L.



**Figure 1:** Individual CRP change – LLLT.



## Discussion

C-reactive protein (CRP) is a key acute-phase reactant and a central biomarker of systemic inflammation in both veterinary and human medicine. Synthesized by hepatocytes in response to pro-inflammatory cytokines—particularly interleukin-6 (IL-6)—elevated CRP is not only a signal of inflammation but also a pathogenic contributor to disease progression [3]. Persistent elevations in CRP are closely associated with a range of chronic conditions, including osteoarthritis, cardiovascular disease, renal dysfunction, diabetes, and neurodegenerative disorders. In dogs with chronic arthritis, as studied here, elevated CRP reflects an ongoing systemic inflammatory state that extends beyond localized joint pathology. This low-grade, chronic inflammation places metabolic strain on multiple organ systems, promoting oxidative stress, endothelial dysfunction, and immune dysregulation [4]. Reducing CRP is therefore not merely a marker of improved inflammation but may have direct therapeutic relevance in limiting progression of age-related comorbidities.

Pharmacologic interventions—particularly non-steroidal anti-inflammatory drugs (NSAIDs)—are commonly used to manage arthritis and systemic inflammation. However, chronic NSAID administration is associated with gastrointestinal ulceration, renal compromise, and hepatotoxicity, especially in geriatric populations with reduced organ reserve [5]. These safety concerns underscore the need for non-pharmacologic, organ-sparing alternatives capable of modulating inflammatory pathways.

The current findings support jugular-applied coherent low-level laser therapy (LLLT) as a promising adjunct or alternative strategy. A single session of LLLT produced a statistically significant reduction in serum CRP ( $-3.06$  mg/L), while placebo handling had no meaningful effect. Though the between-group comparison approached but did not reach significance ( $p = 0.074$ ), the large effect size (Cohen's  $d = -1.80$ ) suggests a biologically relevant response. The mechanism by which jugular LLLT reduces CRP likely involves systemic modulation effects, including mitochondrial activation and enhanced redox balance, downregulation of pro-inflammatory cytokines such as IL-6 and TNF- $\alpha$ , and stabilization of endothelial and immune cell function. Importantly, the jugular vein is a high-flow vascular structure, allowing coherent laser energy to interact with circulating photoacceptors such as hemoproteins. This delivery method may bypass the limitations of traditional site-specific LLLT and instead entrain a global immunomodulatory effect.

## Conclusion

These preliminary results support LLLT as a non-invasive, repeatable, and drug-free modality for managing systemic inflammation in aging or chronically ill dogs. Reducing CRP through such interventions may improve resilience, delay disease progression, and decrease reliance on long-term pharmacotherapy. Further research is warranted to determine the optimal treatment frequency and duration required to maintain or further reduce CRP levels.

## References

1. Luan YY, Yao YM (2018) The clinical significance and potential role of C-reactive protein in chronic inflammatory and neurodegenerative diseases. *Frontiers in immunology* 9: 1302.
2. Wickenheisser VA, Zywtot EM, Rabjohns EM, Lee HH, Lawrence DS, et al. (2019) Laser light therapy in inflammatory, musculoskeletal, and autoimmune disease. *Current allergy and asthma reports* 19: 37.
3. Rizo-Téllez SA, Sekheri M, Filep JG (2023) C-reactive protein: a target for therapy to reduce inflammation. *Frontiers in immunology* 14: 1237729.
4. Mouliou DS (2023) C-reactive protein: pathophysiology, diagnosis, false test results and a novel diagnostic algorithm for clinicians. *Diseases* 11: 132.
5. Bindu S, Mazumder S, Bandyopadhyay U (2020) Non-steroidal anti-inflammatory drugs (NSAIDs) and organ damage: A current perspective. *Biochemical pharmacology* 180: 114147.



- Advances In Industrial Biotechnology | ISSN: 2639-5665
- Advances In Microbiology Research | ISSN: 2689-694X
- Archives Of Surgery And Surgical Education | ISSN: 2689-3126
- Archives Of Urology
- Archives Of Zoological Studies | ISSN: 2640-7779
- Current Trends Medical And Biological Engineering
- International Journal Of Case Reports And Therapeutic Studies | ISSN: 2689-310X
- Journal Of Addiction & Addictive Disorders | ISSN: 2578-7276
- Journal Of Agronomy & Agricultural Science | ISSN: 2689-8292
- Journal Of AIDS Clinical Research & STDs | ISSN: 2572-7370
- Journal Of Alcoholism Drug Abuse & Substance Dependence | ISSN: 2572-9594
- Journal Of Allergy Disorders & Therapy | ISSN: 2470-749X
- Journal Of Alternative Complementary & Integrative Medicine | ISSN: 2470-7562
- Journal Of Alzheimers & Neurodegenerative Diseases | ISSN: 2572-9608
- Journal Of Anesthesia & Clinical Care | ISSN: 2378-8879
- Journal Of Angiology & Vascular Surgery | ISSN: 2572-7397
- Journal Of Animal Research & Veterinary Science | ISSN: 2639-3751
- Journal Of Aquaculture & Fisheries | ISSN: 2576-5523
- Journal Of Atmospheric & Earth Sciences | ISSN: 2689-8780
- Journal Of Biotech Research & Biochemistry
- Journal Of Brain & Neuroscience Research
- Journal Of Cancer Biology & Treatment | ISSN: 2470-7546
- Journal Of Cardiology Study & Research | ISSN: 2640-768X
- Journal Of Cell Biology & Cell Metabolism | ISSN: 2381-1943
- Journal Of Clinical Dermatology & Therapy | ISSN: 2378-8771
- Journal Of Clinical Immunology & Immunotherapy | ISSN: 2378-8844
- Journal Of Clinical Studies & Medical Case Reports | ISSN: 2378-8801
- Journal Of Community Medicine & Public Health Care | ISSN: 2381-1978
- Journal Of Cytology & Tissue Biology | ISSN: 2378-9107
- Journal Of Dairy Research & Technology | ISSN: 2688-9315
- Journal Of Dentistry Oral Health & Cosmesis | ISSN: 2473-6783
- Journal Of Diabetes & Metabolic Disorders | ISSN: 2381-201X
- Journal Of Emergency Medicine Trauma & Surgical Care | ISSN: 2378-8798
- Journal Of Environmental Science Current Research | ISSN: 2643-5020
- Journal Of Food Science & Nutrition | ISSN: 2470-1076
- Journal Of Forensic Legal & Investigative Sciences | ISSN: 2473-733X
- Journal Of Gastroenterology & Hepatology Research | ISSN: 2574-2566
- Journal Of Genetics & Genomic Sciences | ISSN: 2574-2485
- Journal Of Gerontology & Geriatric Medicine | ISSN: 2381-8662
- Journal Of Hematology Blood Transfusion & Disorders | ISSN: 2572-2999
- Journal Of Hospice & Palliative Medical Care
- Journal Of Human Endocrinology | ISSN: 2572-9640
- Journal Of Infectious & Non Infectious Diseases | ISSN: 2381-8654
- Journal Of Internal Medicine & Primary Healthcare | ISSN: 2574-2493
- Journal Of Light & Laser Current Trends
- Journal Of Medicine Study & Research | ISSN: 2639-5657
- Journal Of Modern Chemical Sciences
- Journal Of Nanotechnology Nanomedicine & Nanobiotechnology | ISSN: 2381-2044
- Journal Of Neonatology & Clinical Pediatrics | ISSN: 2378-878X
- Journal Of Nephrology & Renal Therapy | ISSN: 2473-7313
- Journal Of Non Invasive Vascular Investigation | ISSN: 2572-7400
- Journal Of Nuclear Medicine Radiology & Radiation Therapy | ISSN: 2572-7419
- Journal Of Obesity & Weight Loss | ISSN: 2473-7372
- Journal Of Ophthalmology & Clinical Research | ISSN: 2378-8887
- Journal Of Orthopedic Research & Physiotherapy | ISSN: 2381-2052
- Journal Of Otolaryngology Head & Neck Surgery | ISSN: 2573-010X
- Journal Of Pathology Clinical & Medical Research
- Journal Of Pharmacology Pharmaceutics & Pharmacovigilance | ISSN: 2639-5649
- Journal Of Physical Medicine Rehabilitation & Disabilities | ISSN: 2381-8670
- Journal Of Plant Science Current Research | ISSN: 2639-3743
- Journal Of Practical & Professional Nursing | ISSN: 2639-5681
- Journal Of Protein Research & Bioinformatics
- Journal Of Psychiatry Depression & Anxiety | ISSN: 2573-0150
- Journal Of Pulmonary Medicine & Respiratory Research | ISSN: 2573-0177
- Journal Of Reproductive Medicine Gynaecology & Obstetrics | ISSN: 2574-2574
- Journal Of Stem Cells Research Development & Therapy | ISSN: 2381-2060
- Journal Of Surgery Current Trends & Innovations | ISSN: 2578-7284
- Journal Of Toxicology Current Research | ISSN: 2639-3735
- Journal Of Translational Science And Research
- Journal Of Vaccines Research & Vaccination | ISSN: 2573-0193
- Journal Of Virology & Antivirals
- Sports Medicine And Injury Care Journal | ISSN: 2689-8829
- Trends In Anatomy & Physiology | ISSN: 2640-7752

Submit Your Manuscript: <https://www.heraldopenaccess.us/submit-manuscript>