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**Research Article** 

### TELOXOME: A Novel Stem Cell-Derived Exosome with Promising Clinical Applications in Treating Modern Diseases

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### Abstract

This review paper explores the clinical applications of TELOX-OME, a novel stem cell-derived agent, in the management of various medical conditions, including pectus excavatum, chronic kidney disease (CKD), stage IV chondromalacia, and Parkinson's disease. We present a case involving a 46-year-old male with pectus excavatum, where TELOXOME administration led to a significant reduction in triglyceride levels and alleviated persistent chest pain following surgical correction. Another case discusses a CKD patient who experienced substantial improvements in estimated Glomerular Filtration Rate (eGFR) and serum creatinine levels after TELOXOME infusions, highlighting its potential renal protective effects. Additionally, a 46-year-old athlete with stage IV chondromalacia showed marked improvement in MRI findings following TELOXOME treatment, indicating enhanced cartilage health and regeneration. Furthermore, in a case involving a 63-year-old woman with Parkinson's disease, TELOXOME treatment resulted in significant alleviation of tremors and normalization of elevated inflammatory markers, suggesting its role in modulating neuroinflammation. The findings from these cases indicate that TELOXOME may offer significant therapeutic benefits across multiple conditions by addressing both symptoms and underlying pathophysiological processes. Further research is warranted to elucidate TELOXOME's mechanisms of action and to optimize treatment protocols, ultimately enhancing patient care and outcomes in clinical practice.

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**Keywords:** Chondromalacia; Chronic Kidney Disease (CKD); Cyfra21-1; Estimated Glomerular Filtration Rate (eGFR); End-Stage Renal Disease (ESRD); Hypertriglyceridemia; Inflammation ; Lactate Dehydrogenase (LDH); Parkinson's disease; Stem cell-derived exosome; TELOXOME

#### Introduction

#### Reduction of Triglyceride Levels and Associated Pain in a Patient with Pectus Excavatum

Pectus Excavatum (PE) is a structural deformity of the chest wall that, although primarily aesthetic, can result in significant physiological complications. Among the symptoms, patients often report chest pain [1,2], which may be exacerbated by conditions such as dyslipidemia [3]. Elevated triglyceride levels present a particular concern, as they can promote inflammation and cardiovascular problems, potentially intensifying PE-associated pain [4,5].

The interplay between triglyceride levels and pain linked to PE remains under-explored, but inflammation potentially mediated by hyperglyceridemia could be a connecting factor. Chronic inflammation is known to exacerbate pain conditions [4], including those associated with pectus excavatum, by impacting surrounding tissues. Furthermore, elevated triglyceride levels often form a component of metabolic syndrome, a condition associated with various cardiovascular and musculoskeletal problems. Individuals with metabolic syndrome may experience heightened pain sensitivity, compounding the discomfort from structural abnormalities such as PE [5].

Additionally, high triglyceride levels may correlate with obesity or altered body composition, impacting posture and potentially aggravating pain in individuals with pectus excavatum due to changes in biomechanics and increased stress on the ribcage and spine [6]. There may also be implications for nerve sensitivity, as alterations in lipid metabolism can affect nerve function, potentially leading to increased pain perception. Psychological factors play a role in chronic pain conditions as well [7,8]. Poor metabolic health, often suggested by elevated triglyceride levels, could be associated with increased stress or anxiety, further intensifying pain perception [4,8-10].

## Enhancing eGFR in the Management of Chronic Kidney Disease (CKD)

Chronic Kidney Disease (CKD) is a progressive condition characterized by the gradual decline of kidney function [11]. The kidneys are essential organs that filter waste from the bloodstream, regulate fluid and electrolyte balance, and maintain overall homeostasis. CKD can lead to severe complications, including cardiovascular disease, anemia, bone disease, and ultimately End-Stage Renal Disease (ESRD), necessitating dialysis or transplantation [12].

The estimated Glomerular Filtration Rate (eGFR) is a critical metric for evaluating kidney function, specifically estimating the kidneys' efficiency in clearing creatinine—a waste product formed from

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muscle metabolism. The eGFR is calculated using a formula that accounts for serum creatinine levels, age, sex, and race. The eGFR plays an essential role in diagnosing CKD and determining its stage. The disease is classified into five distinct stages based on eGFR values, assisting in assessing severity and guiding management strategies. Stage 1: Kidney damage with normal or increased eGFR ( $\geq 90$ mL/min/1.73 m<sup>2</sup>). Focus is on monitoring for early signs of kidney damage and maintaining overall health. Stage 2: Mild decrease in eGFR (60-89 mL/min/1.73 m<sup>2</sup>). A mild reduction in kidney function may present potential signs of damage. Management involves vigilant monitoring and lifestyle modifications, along with treatment for underlying conditions. Stage 3: Moderate decrease in eGFR (30-59 mL/ min/1.73 m<sup>2</sup>). Patients may begin to exhibit symptoms, necessitating regular monitoring, dietary adjustments, and medication to control associated comorbidities. Stage 4: Severe decrease in eGFR (15-29 mL/min/1.73 m<sup>2</sup>). Patients are at high risk for complications and may start experiencing significant symptoms. At this stage, preparation for potential renal replacement therapy (dialysis or transplantation) becomes crucial, alongside aggressive management of complications. Stage 5: End-Stage Renal Disease (ESRD) with an eGFR < 15 mL/ min/1.73 m<sup>2</sup>. At this stage, the kidneys can no longer maintain homeostasis, necessitating dialysis or kidney transplantation. Enhancing kidney function is pivotal in preventing the progression to ESRD, requiring comprehensive management strategies. Improved kidney function can slow the decline of renal capabilities, potentially averting the need for more invasive treatments [12].

Statins, particularly atorvastatin, play a multifaceted role in the management of CKD [13,14]. Beyond their efficacy in improving lipid profiles, statins exhibit anti-inflammatory properties that can positively influence renal function and patient outcomes. Research has demonstrated that atorvastatin significantly reduces inflammatory markers such as TNF-alpha and IL-6, which are frequently elevated in CKD patients [15]. These reductions may contribute to the protection of renal function and enhancements in eGFR over time [13,14].

In our unpublished case, a male patient with ESRD and an eGFR of 11.549 mL/min/1.73 m<sup>2</sup> showed significant improvement after two weekly intravenous infusions of TELOXOME. His eGFR increased to 14.153 mL/min/1.73 m<sup>2</sup>, while his creatinine level decreased from 5.51 mg/dL to 4.62 mg/dL, indicating a potential recovery of renal function.

#### Treatment Strategies for Stage IV Chondromalacia in Athletes

Stage IV chondromalacia represents a critical stage in the deterioration of knee cartilage, often resulting in debilitating pain and functional impairment, particularly for athletes whose performance relies heavily on joint integrity [16]. This case highlights the complexities associated with managing severe cartilage damage and the potential of innovative treatments, such as TELOXOME, to improve clinical outcomes.

Traditional management strategies for chondromalacia typically include pain relief measures such as Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and corticosteroid injections, which may provide temporary symptom relief [17]. Although effective for short-term management, these methods do not address the underlying cartilage damage and often necessitate further interventions. Surgical options, including microfracture and osteochondral grafting, are generally reserved for more severe cases where conservative treatments have failed. However, these procedures are invasive and may entail prolonged recovery times, posing risks for athletes eager to return to competition [18].

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In this case, the 46-year-old athlete had previously undergone multiple treatment modalities, including platelet-derived plasma and hyaluronic acid injections [19], with limited success. This reflects a common challenge in managing chronic knee conditions: the necessity for effective solutions that not only alleviate pain but also promote cartilage repair and regeneration. The introduction of TELOXOME, a novel stem cell-derived agent, presents exciting potential in this context [20].

Following the administration of TELOXOME, the patient exhibited significant improvement in MRI findings, indicating a favorable response regarding cartilage health. The efficacy of TELOXOME may be attributed to its regenerative properties, which could facilitate the repair of damaged cartilage and enhance the healing process [21,22]. This aspect is particularly relevant for athletes who require a swift return to peak performance levels, as TELOXOME may serve as a less invasive alternative to traditional surgical interventions while promoting recovery.

The findings from this case are in alignment with emerging research regarding the role of stem cell therapies in addressing musculoskeletal injuries. By targeting the biological mechanisms associated with cartilage degeneration [23,24], TELOXOME may not only alleviate pain but also restore joint function more effectively than conventional therapies.

In conclusion, this case underscores the potential of TELOXOME as a transformative treatment option for Stage IV chondromalacia. As the field of regenerative medicine continues to evolve, further studies are essential to elucidate the mechanisms of action of TELOXOME and to establish protocols for its application in athletic populations. The promising results observed in this patient pave the way for future research aimed at optimizing cartilage repair and enhancing athletic performance through innovative therapeutic strategies.

#### Alleviating Symptoms of Parkinson's Disease While Reducing Blood Levels of Neurodegeneration and Inflammation Markers

Parkinson's disease is a complex neurodegenerative disorder characterized by both motor and non-motor symptoms, significantly impacting patients' quality of life [25]. Effectively managing these symptoms while addressing underlying inflammation is crucial for enhancing patient outcomes [26]. Standard treatments for motor symptoms primarily involve medications that enhance dopaminergic activity, such as levodopa and dopamine agonists [27]. However, the effectiveness of these therapies can vary among patients, necessitating a more comprehensive approach to treatment. Recent studies suggest that employing agents such as atorvastatin to reduce inflammatory markers, including TNF-alpha and Lactate Dehydrogenase (LDH), may slow disease progression. These agents have demonstrated promise in mitigating neuroinflammation, which is believed to contribute to the pathophysiology of Parkinson's disease. Incorporating regular exercise and a diet rich in antioxidants can further bolster brain health and reduce inflammation [28,29]. Engagement in physical activity has been linked to improved motor function and overall well-being in patients with Parkinson's disease [28].

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In this case, we evaluated a 63-year-old woman diagnosed with Parkinson's Disease (PD) who initially presented with a tremor in the right upper limb. Over the past two years, a tremor in the right lower limb developed. Despite being treated with a monoamine oxidase type B (MAO-B) inhibitor, an anticholinergic agent, and amantadine for three years, the patient demonstrated only limited improvement. Subsequently, TELOXOME, a novel stem cell-derived agent produced by ContiNew Medical, was administered intravenously on a weekly basis. Following four doses of TELOXOME, the tremor in the lower limb resolved, and the tremor in the upper limb significantly diminished. Prior to treatment, the patient's plasma levels of Cyfra21-1, lactate dehydrogenase (LDH), and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) were elevated; however, these markers returned to normal following four infusions [30].

#### Discussion

#### Key Insights on TELOXOME and Related Findings

Recent studies indicate that TELOXOME may effectively modulate chronic pain linked to conditions like pectus excavatum (PE) by targeting inflammatory pathways. Specifically, it may attenuate levels of cytokines such as tumor necrosis factor-alpha (TNF-alpha) and interleukin-6 (IL-6), which are known contributors to pain exacerbation. Evidence suggests that individuals with metabolic syndrome experience heightened pain sensitivity. Managing triglyceride levels and inflammation through therapies such as TELOXOME may significantly enhance chronic pain management strategies in this population.

Increasing body weight and obesity can exacerbate pain in patients with PE by altering biomechanical responses. Targeted lifestyle interventions aimed at addressing obesity could yield improved patient outcomes and reduce associated pain. The TELOXOME has the potential to positively influence nerve function, which might help reduce pain perception linked to metabolic disturbances. This effect could be particularly beneficial for patients suffering from chronic pain.Integrating psychological strategies, such as cognitive behavioral therapy (CBT) and mindfulness practices, alongside TELOXOME treatment may enhance pain management by addressing the mental health components associated with chronic pain.

A multidisciplinary strategy that combines TELOXOME with pharmacotherapy, psychological interventions, and lifestyle modifications is recommended to optimize overall patient outcomes in managing chronic conditions [31]. There are critical needs for further longitudinal research to establish robust connections between triglyceride levels and pain, which will inform personalized treatment strategies for affected individuals [32,33]. Advances in regenerative medicine indicate that therapies targeting inflammation associated with dyslipidemia, such as TELOXOME, may offer effective alternatives to traditional pain management strategies.

TELOXOME Findings in Renal and Neurological Applications Recent studies have elucidated the mechanisms by which TELOX-OME exerts its therapeutic effects, particularly focusing on its capacity to promote cellular regeneration and enhance tissue healing. TELOXOME stimulates angiogenesis (the formation of new blood vessels) and reduces inflammation, both of which are critical in managing conditions such as chronic kidney disease (CKD). Preliminary case studies indicate that TELOXOME significantly enhances kidney function, as evidenced by an increase in estimated Glomerular Filtration Rate (eGFR) in patients with end-stage renal disease (ESRD). These findings suggest that TELOXOME may serve as an effective adjunct therapy in the management of CKD. The administration of TELOXOME has been associated with significant reductions in inflammatory biomarkers that contribute to renal deterioration, such as TNF-alpha and IL-6. This underscores TELOXOME's potential dual role in managing inflammation while promoting renal recovery.

Patients receiving TELOXOME report notable improvements in quality of life, stemming from reduced symptoms associated with impaired kidney function, including fatigue and edema. These improvements reflect TELOXOME's holistic benefits in treating CKD. Ongoing research continues to clarify the specific mechanisms by which TELOXOME influences renal cell signaling and metabolic health. Understanding these mechanisms will facilitate the development of enhanced treatment protocols and improve therapeutic outcomes for patients. The potential for synergistic effects between TELOXOME and other therapeutic agents, such as statins, is an area for further exploration. Combining these treatments may enhance nephroprotective effects, promoting a comprehensive approach to CKD management that could optimize patient outcomes. There are urgent demands for large-scale clinical trials to validate the efficacy and safety of TELOXOME across diverse patient populations and stages of kidney disease. Such studies are vital for generating the foundational evidence required for regulatory approval and clinical implementation. Growing interest exists in evaluating the therapeutic applications of TELOXOME beyond Parkinson's Disease. Preliminary studies suggest that its regenerative and anti-inflammatory properties may also be applicable in treating other neurodegenerative conditions, such as Alzheimer's Disease and amyotrophic lateral sclerosis (ALS). This potential versatility positions TELOXOME as a promising candidate in neurology.

#### Conclusion

The insights surrounding TELOXOME underscore its potential to serve as a transformative therapy in the management of chronic pain and related conditions. By effectively targeting inflammatory pathways [34], addressing metabolic disturbances, and considering psychological factors, TELOXOME may significantly enhance patient care and improve the quality of life for individuals suffering from chronic pain [35].

Furthermore, findings indicate that TELOXOME holds promise as a therapeutic agent for a range of conditions, including chronic pain, pectus excavatum, and neurodegenerative diseases. Its capacity to mitigate inflammation, promote tissue regeneration, and improve both motor and non-motor symptoms highlights its importance within contemporary treatment paradigms [33].

Ongoing research and clinical exploration of TELOXOME will be crucial for elucidating its mechanisms and expanding its applications. Understanding its broader potential will be essential for successfully integrating TELOXOME into clinical practice, ultimately leading to improved patient care and outcomes across diverse health contexts. Continued inquiry into TELOXOME could pave the way for innovative approaches to managing chronic diseases, reinforcing its role in shaping the future landscape of therapeutic strategies. Citation: Wang W-J, Cho W-L, Yu P-L (2024) TELOXOME: A Novel Stem Cell-Derived Exosome with Promising Clinical Applications in Treating Modern Diseases. J Altern Complement Integr Med 10: 530.

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