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The Biological Basis of Trust

"Trust pervades human societies. Trust is indispensable in friendship, love, families, and organizations, and plays a key role in economic exchange and politics. In the absence of trust among trading partners, market transactions break down. In the absence of trust in a country's institutions and leaders, political legitimacy breaks down... Little is known, however, about the biological basis of trust among humans." A landmark study by Kosfeld et al. of the University of Zurich, and published in Nature in 2005, showed "that intranasal administration of oxytocin, a neuropeptide that plays a key role in social attachment and affiliation in non-human mammals, causes a substantial increase in trust among humans, thereby greatly increasing the benefits from social interactions." [1]

The above report resulted in a surge of intranasal oxytocin studies and most emphasized a role for oxytocin in increasing prosocial behaviors such as trust, altruism, affiliation, empathy, and romantic relationships. "Building on the solid foundation of animal research, studies in healthy human subjects subsequently laid the groundwork [to] examine the effectiveness of using intranasal oxytocin to ameliorate symptoms of social dysfunctions in various psychiatric conditions, including schizophrenia, autism, psychopathy, borderline personality disorder, and social anxiety. Complementary evidence … has linked oxytocin to affiliation and prosocial behavior in healthy and disease states … in recent years, it is increasingly acknowledged that the effects of oxytocin are not monolithic and are more complex than previously believed." [2]

Intranasal Oxytocin in the Treatment of Autism Spectrum Disorders

Intranasal oxytocin has been shown to promote social functioning and has recently been applied as a treatment for autism spectrum disorders (ASD). A meta-analysis aimed to

assess the crucial question of oxytocin's efficacy in the treatment of ASD. Researchers performed a systematic literature search, including randomized, single- or double-blind/open-label and placebo-controlled clinical trials as well as single-arm, non-randomized and uncontrolled studies investigating exogenous oxytocin effect on ASD. A total of 28 studies (N = 726 ASD patients) met the predefined inclusion criteria. They used a multilevel meta-analytic model and found that oxytocin had beneficial effects on social functioning, but they did not find strong evidence for symptoms improvement in the non-social domain. Findings suggest that oxytocin administration can be regarded as an effective treatment for some core aspects of ASD, especially in the domain of social functioning, highlighting the promise of using oxytocin to address core social impairments in ASD.[3]

Intranasal Therapy for Pain: Oxytocin and Other Polypeptides

Bharadwaj (Department of Anesthesiology, Perioperative and Pain Medicine, School of Medicine, Stanford University) et al. noted that pain, particularly chronic pain, remains one of the most debilitating and difficult-to-treat conditions in medicine. Chronic pain is difficult to treat, in part because it is associated with plastic changes in the peripheral and central nervous systems. Polypeptides, such as oxytocin, are linear organic polymers that are highly selective molecules for neurotransmitter and other nervous system receptors sites, including those associated with pain and analgesia, and so have tremendous potential in pain therapeutics. However, delivery of polypeptides to the nervous system is largely limited due to rapid degradation within the peripheral circulation as well as the blood-brain barrier. One strategy that has been shown to be successful in nervous system deposition of polypeptides is intranasal delivery. The researchers reviewed the delivery of polypeptides to the peripheral and central nervous systems following intranasal administration and discussed the mechanism of delivery via the nasal-cerebral pathway. They reviewed recent studies that demonstrate that polypeptides such as oxytocin, delivered intranasally, not only reach key pain-modulating regions in the nervous system but, in doing so, evoke significant analgesic effects. Intranasal administration of polypeptides has tremendous potential to provide a non-invasive, rapid, and effective method of delivery to the nervous system for chronic pain treatment and management.[4]

Current treatments for chronic pain (e.g., opioids) can have adverse side effects and rarely result in resolution of pain. As such, there is a need for adjuvant analgesics that are non-addictive, have few adverse side effects, and are effective for pain management across several chronic pain conditions. Oxytocin is a naturally occurring hormone that has gained attention for its potential analgesic properties. The objective of a registered clinical trial (https://clinicaltrials.gov/ct2/show/NCT04903002) is to evaluate the efficacy of intranasal oxytocin on pain and function among adults with chronic pain. This placebo-controlled, triple-blind, sequential, within-subject crossover trial will recruit adults with chronic neuropathic, pelvic and musculoskeletal pain from three Canadian provinces. Enrolled patients will provide one saliva sample pretreatment to evaluate basal oxytocin levels and polymorphisms of the oxytocin receptor gene before being randomized to one of two trial arms. Patients will self-administer three different doses of oxytocin nasal spray twice daily for a period of 2 weeks (ie, 24 IU, 48 IU, and placebo). Patients will complete daily diaries, including standardized measures on day 1, day 7, and day 14. Primary outcomes include pain and pain-related interference. Secondary outcomes include emotional function, sleep disturbance, and global impression of change. Analyses will be performed to evaluate whether improvement in pain and physical function will be observed posttreatment. Results will be disseminated through publication in peer-reviewed journals and presentations at scientific conferences. [5]

Intranasal Oxytocin: Future Directions for Clinical Research

Basic and clinical research on the modulatory role of the neuropeptide oxytocin on social

cognition and behavior in humans primarily employs intranasal application protocols. This approach assumes that intranasal administration increases oxytocin levels in the central nervous system via a direct nose-to-brain route, which in turn acts upon centrally-located oxytocin receptors to exert its behavioral effects. However, debates have emerged on whether intranasally administered oxytocin enters the brain via the nose-to-brain route and whether this route leads to functionally relevant increases in central oxytocin levels. Quintana et al. outlined recent advances from human and animal research that provide converging evidence for functionally relevant effects of intranasal administration of oxytocin, suggesting that direct nose-to-brain delivery underlies the behavioral effects of oxytocin on social cognition and behavior.6

Ask our compounding professionals for more information about intranasal oxytocin.

References

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