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Sanotize: Topical Nitric Oxide Nasal Spray To Prevent Viral Infections

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SaNOtize treats infectious diseases using the antimicrobial properties of a nitric oxide (NO) releasing solution to create safe and effective topical drugs. SaNOtize's liquid formulation releases NO gas in dose-controlled concentrations to offer broad-spectrum antiviral activity against SARS-CoV -2, influenza, and other respiratory viruses. NO releasing nasal spray (NONS) is envisioned as a broad-spectrum self-administered antiviral that would be a first line of defense against a wide variety of airborne viruses. Unlike other antivirals, NONS is pathogen-agnostic and unlikely to cause drug resistance. Clinical results in previous SARS-CoV-2 studies demonstrate the potential for NONS to act as a both a treatment and prophylaxis against SARS-CoV-2 respiratory virus.

Results of a recent Phase III study (doi: 10.1016/j.lansea.2022.100036) demonstrated that NONS accelerated SARS-CoV-2 clearance from the nasal passages of recently infected patients. This randomized double-blind placebo-controlled trial tested the efficacy and safety of NONS in treating mild COVID-19 (Delta & Omicron variants) infection in adult non-hospitalized patients at risk of illness progression (unvaccinated, >45 years of age, or comorbidities). Randomization was 1:1, NONS (n=153) vs placebo (n=153). NONS was self-administered 6 times daily as 2 sprays per nostril for 7 days.

Overall, mean SARS-CoV-2 RNA concentrations (6·96 log10 copies/mL in the NONS group and 7·16 log10 copies/mL in the placebo group) were comparable at baseline. Primary endpoint mean treatment difference SARS-CoV-2 RNA change from baseline to the end of treatment (EOT) was -0·52 copies/mL (SE 0·202, 95% CI -0·92 to -0·12; p=0·010) with NONS compared to placebo at the end of the 7 day treatment. Secondary endpoint assessments demonstrated a greater proportion of patients receiving NONS (82·8%) cleared SARS-CoV-2 (RT-PCR negative) by EOT compared to placebo (66·7%, p=0·046), with no virus RNA detected a median of four days earlier compared to placebo (three vs seven days; p=0·044).

Further, the reduction in viral loads was larger in those at risk of illness progression, both when analyzed by mean and normalized AUC values over the treatment period. SARS-CoV-2 RNA reduction was 93.7% at 24 hours and 98.9% at 48 hours with NONS treatment in the high-risk population, and those receiving NONS had an 8.1 fold greater SARS-CoV-2 reduction compared to placebo at 48 hours of treatment. NONS administered to the high-risk population in this study resulted in greater reduction in viral load from baseline (Day 1) through Day 8 compared to placebo (mean -0.52, 95% CI -0.92, -0.12). COVID-19 infected subjects receiving NONS were 35.4% more likely to demonstrate a RT-PCR negative conversion at the end of treatment compared to those receiving placebo. Clinically, more subjects receiving NONS were asymptomatic with no detectable SARS-CoV-2 RNA, based on the WHO Clinical Progression Scale score (two or more point reduction), near the end of the study compared to placebo (Day 16 treatment difference 12.6%, 95% CI 0.1, 25.1; p=0.038).

This Phase III trial supports using NONS to accelerate the reduction of SARS-CoV-2 from the nasal cavity. Implications include decreasing the duration of COVID-19 infectivity, possibly reducing hospital admissions, length of stay, diminishing disease severity and disease transmission.