Dose-Dependent Modulation of Swallowing by BAB-02001 in a Preclinical Animal Model of Swallowing

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Introduction: Millions of people worldwide suffer from swallowing impairment as a result of stroke, head and neck cancer, parkinsonism, frailty and other disorders. It has been hypothesized that sensory enhancement of the bulbar system may improve swallowing safety and efficiency. The purpose of this investigation was to evaluate the effect of BAB- 02001, a novel sensory agonist nearing Phase I human studies, on swallowing pressure and frequency in a preclinical model.

Methods: Male Landrace pigs (25–30 kg, n = 6–12 per dose) were lightly anaesthetised with urethane (1.5 g kg-1 i.v.). A high-resolution manometry catheter and submental surface EMG recorded pharyngeal swallowing pressure (mbar) and frequency (swallows min-1). After a 10-min baseline, animals received a single topical oropharyngeal administration of BAB-02001 in PEG400/water (20/80) at 1, 3 or 10 mg (1 mL “injection-droplet” mode). Vehicle-treated litter-mates served as controls. Data were analysed as fold-change (post/pre) and percent change using one-way ANOVA with Dunnett correction.

Results: Pharyngeal pressure rose over baseline by +62 %, +131 % and +300 % at 1, 3 and 10 mg, respectively ($p=0.0014$, $p<0.0001$, and $p<0.0001$ and $n=11$, 12, and 4, respectively). Swallowing frequency also increased by 89, 180 and 250%, respectively ($p=0.0015$, $p<0.0001$ and $p=0.0003$). No tachyphylaxis was observed after a second administration 60 min later, and no changes in cardiovascular parameters or laryngeal mucosa were detected.

Conclusion: Sensory enhancement with BAB-02001 robustly augments both the force and cadence of swallowing in a clinically relevant large-animal model. The clear dose–response, coupled with efficacy at low milligram topical doses and an excellent acute safety profile, supports development of an oropharyngeal spray for acute treatment of OD. These findings justify progression to first-in-human studies to confirm safety, optimal dose and translational biomarkers of swallow facilitation.