

BACKGROUND

In 2007, the World Health Assembly underscored the importance of providing safe, effective, and proven medicines for children. However, the widespread lack of pediatric-specific drug products forces medical providers and pharmacists to use alternative solutions to treat their pediatric patients that are not backed by key bioavailability, stability, and safety studies.(1, 2) These methods are inconsistent and unreliable and often lead to dosing errors, adverse drug effects, decreased bioavailability or efficacy, complicated dosing requirements, or non-adherence because of foul-tasting components.(3) This lack of child-friendly formulations affects 40 percent of the global population, subjecting pediatric patients to avoidable adverse drug events, reduced compliance with medication regimens, limited access to new medications, and prolonged treatable illnesses.(4)

The corticosteroid prednisone is known as one of the most foul-tasting active pharmaceutical ingredients (API) on the market. Orbis Biosciences set out to prove their taste masking technology using this well-known foul API. This issue brief details the results of the Palatability Study that tested Orbis formulations against the marketed drug.

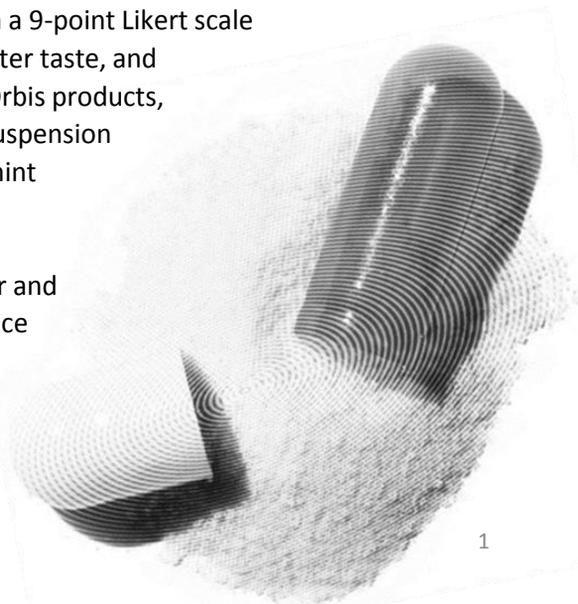
STUDY DESIGN

The Palatability Study was conducted with 24 healthy young adult volunteers at the Pediatric Clinical Research Unit of Arkansas Children's Hospital. The volunteers were enrolled by written informed consent to an IRB-approved protocol. There were four arms to the study:

- 1) (Reference) Prednisone solution USP 5 mg / 5ml (10 mg dose in 10 ml total volume) source Roxanne Laboratories
- 2) Prednisone-loaded microsphere suspension (10 mg dose in 10 mL total volume) prepared at least 24 hours in advance of taste test; source Orbis Biosciences
- 3) Prednisone-loaded microsphere suspension (10 mg dose in 10 mL total volume) prepared approximately 5 minutes prior to the taste test; source Orbis Biosciences
- 4) (Placebo) Prednisone-free microsphere suspension (10 mL total volume); source Orbis Biosciences.

The volunteers were given a questionnaire with a 9-point Likert scale that described the taste, texture/mouth feel, after taste, and willingness-to-take of each product. All three Orbis products, including the placebo utilized a mint-flavored suspension media. Roxane Liquid is delivered in a peppermint and vanilla solution.

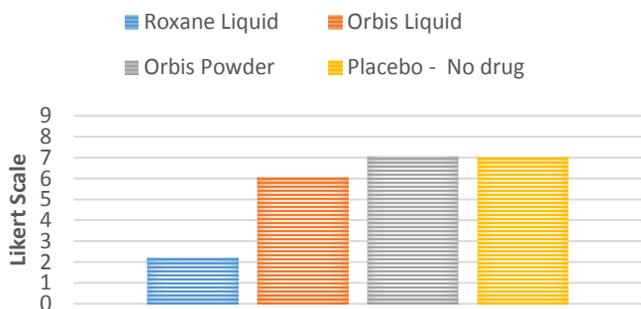
Linear mixed-effect models adjusting for gender and age were used to detect any significant difference between the four products. Crossover effects between the arms were evaluated and if any significant carryover effects were detected, results from both with and without adjustment were presented in the full report.



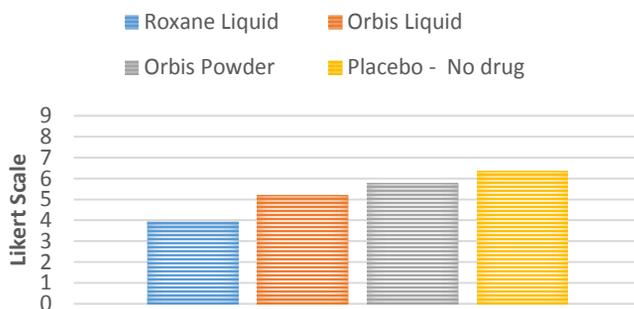
STUDY RESULTS

The below graphs summarize the results of the palatability study. Taste, smell, and after taste utilized a Likert scale that ranged from 1 to 9 with 1 representing “Dislike Extremely”, 5 representing “Neither Like nor Dislike” and, 9 representing “Like Extremely.” Willing to take utilized a Likert scale that ranged from 1 to 9 with 1 representing “Extremely Unlikely,” 5 representing “No Preference,” and 9 representing “Extremely Likely.”

WHAT DID YOU THINK OF THE TASTE?

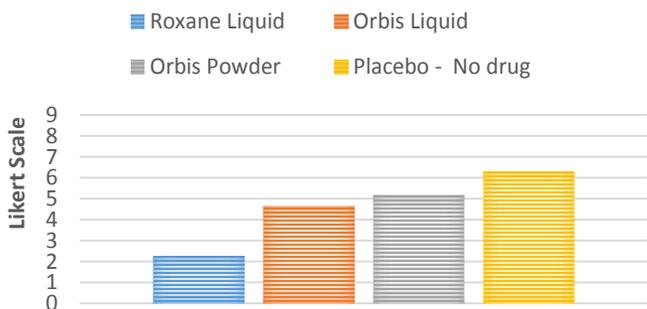


WHAT DID YOU THINK OF THE TEXTURE/MOUTH FEEL?

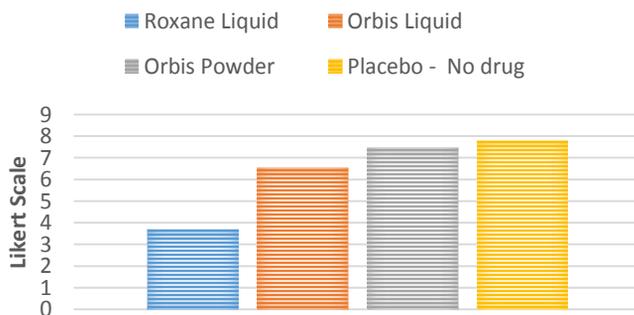


“The study proved, without a shadow of a doubt, that Orbis’ technology is completely effective at taste masking.”
 – Dr. Gregory Kearns, PharmD, PhD, FCP, FAAP President of the Arkansas Children’s Hospital Research Institute

WHAT DID YOU THINK OF THE AFTER TASTE?



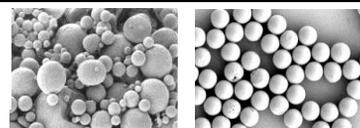
WOULD YOU BE WILLING TO TAKE THIS PRODUCT IF PRESCRIBED?



The results of the study showed that Orbis’ liquid formulation and powder formulation were preferable over the reference listed drug (Roxane Liquid) in every category, especially taste. The main conclusion of the report was that the Orbis powder and the Placebo (which was an Orbis microsphere with no drug load) were indistinguishable from each other. This finding proves that the Orbis powder is completely taste-masked as there would be no bitter taste for a placebo as it is lacking drug.

In a recent review of the research on bad tasting medicine, the authors found that having a true taste mask can increase compliance by 53 to 90 percent.(5) With Orbis’ technology, pharmaceuticals will be able to achieve taste masking of even the most bitter active pharmaceuticals.

For more information on this palatability study please contact us at info@orbis.com. Citations follow on page 3.



CITATIONS

1. Anonymous (2002) Best Pharmaceuticals for Children Act. in Public Law 107-109 (Washington, DC).
2. Anonymous (2006) Regulation No. EC 1901/2006. ed EC EPatC (Brussels).
3. Matsui D (2007) Current issues in pediatric medication adherence. *Paediatr Drugs* 9(5):283-288.
4. Milne CP & Bruss JB (2008) The economics of pediatric formulation development for off-patent drugs. *Clinical therapeutics* 30(11):2133-2145.
5. Mannella, J. A., Spector, A. C., Reed, D. R., & Coldwell, S. E. (2013). The bad taste of medicines: Overview of basic research on bitter taste. *Clinical Therapeutics*, 35(8), 1225-1246.