

# ASSESSING THE BITTER TASTE OF MEDICINES: A COMPARISON BETWEEN RAT TASTE PANELS (VIA THE BRIEF-ACCESS TASTE AVERSION (BATA) MODEL) AND HUMAN TASTE PANELS

**J Soto<sup>a</sup>, G Winzenburg<sup>b</sup>, R Turner<sup>b</sup>, S Desset-Brèthes<sup>b</sup>, Y Sheng<sup>a</sup>, M Orlu-Gul<sup>a</sup> and C Tuleu<sup>a</sup>**

<sup>a</sup>*UCL School of Pharmacy, 29/39 Brunswick Square, WC1N 1AX, London, United Kingdom*

<sup>b</sup>*Novartis Pharma AG, Basel, Switzerland*

## Introduction

Taste assessment has become an important element of pharmaceutical drug development especially since paediatric regulations have been enforced in the US and EU. Evaluating the taste of new active pharmaceutical ingredients (APIs) is therefore essential to put in place adequate taste-masking techniques which will lead to appropriate palatable formulation. Thus, there is an urgent need to develop and optimise taste assessment methods that can be used at different stages of the drug development process.

## Purpose

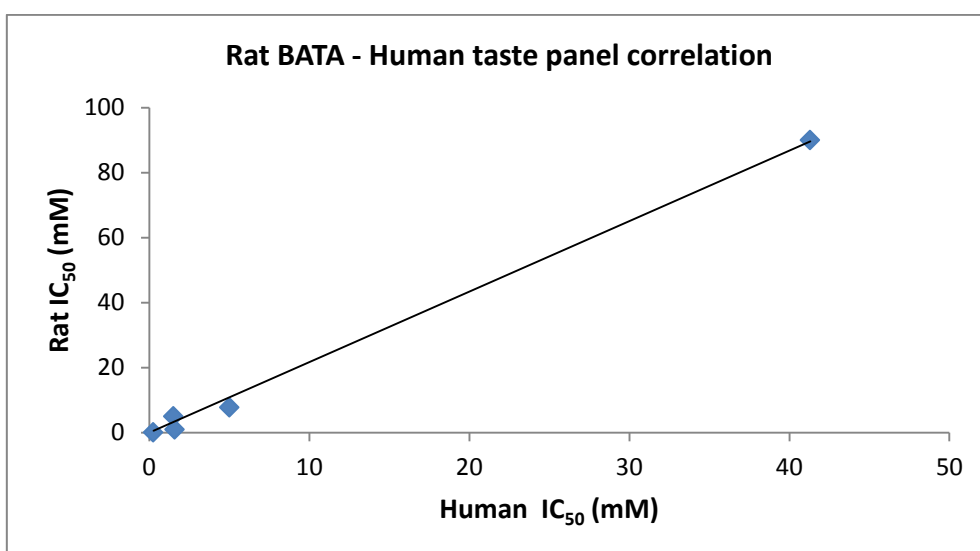
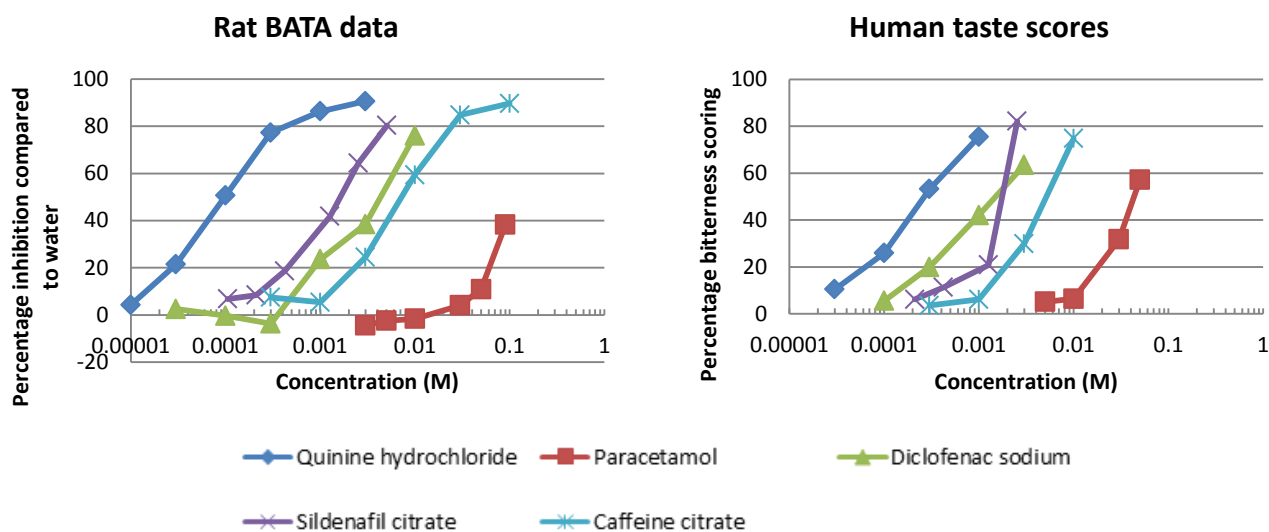
To assess the validity of the *in vivo* rat brief-access taste aversion (BATA) model as a screening tool for taste assessment of APIs and to compare the rat panel results with the human taste results.

## Materials and Methods

Five bitter model drug substances have been selected to verify the model. The taste of 6 concentrations of quinine hydrochloride dihydrate (QHD), caffeine citrate (CC), diclofenac sodium (DS), sildenafil citrate (SC) and paracetamol (PAR) in water was assessed in ten male Sprague-Dawley rats with the BATA model (Soto et al. 2015). Taste was assessed using the lickometer “Davis Rig MS-160”, an apparatus that electronically records the number of licks that mildly water-deprived rats do to different API samples presented randomly. The taste of 4 concentrations of these same drugs was also assessed by a human taste panel conducted in 20 healthy young volunteers using the “swirl and spit” method. [UCL REC 4612/005]: 10 mL of each sample were gargled for 5 s and then expectorated. The volunteers rated the taste intensity on a Visual Analogue Scale (VAS) using the software *Qualtrics*.

## Results

The rat data showed the same rank order of bitterness prediction ( $IC_{50}$ ) as the human panel for all the drugs. Despite a slight shift between rats’ and humans’ responses, a good correlation ( $R^2 = 0.9968$ ) was observed. Furthermore, a lower variability was observed in the rat panel.



## Conclusions

The taste of five different API's has been tested using two different methods, the rat and the human taste panels. An excellent correlation between the two methods was obtained which is a further milestone towards the validation of the animal model as an *in vivo* taste assessment tool.

## References

Soto, Jessica, Yucheng Sheng, Joseph F. Standing, Mine Orlu Gul, and Catherine Tuleu. 2015. "Development of a Model for Robust and Exploratory Analysis of the Rodent Brief-Access Taste Aversion Data." *European Journal of Pharmaceutics and Biopharmaceutics* 91: 47–51.