# silicomodellingmasstransferabsorptionhumangut-moxon

**Backlinks**

- Chemical Engineering papers
- In silico modelling of mass transfer & absorption in the human gut

**Abstract**

An in silico model has been developed to investigate the digestion and absorption of starch and glucose in the small intestine. The main question we are aiming to address is the relative effect of gastric empting time and luminal viscosity on the rate of glucose absorption. The results indicate that all factors have a significant effect on the amount of glucose absorbed. For low luminal viscosities (e.g. lower than 0.1 Pas) the rate of absorption is controlled by the gastric emptying time. For viscosities higher than 0.1 Pas a 10 fold increase in viscosity can result in a 4 fold decrease of glucose absorbed. Our model, with the simplifications used to develop it, indicate that for high viscosity luminal phases, gastric emptying rate is not the controlling mechanism for nutrient availability. Developing a mechanistic model could help elucidate the rate limiting steps that control the digestion process.

## Introduction:

a. Purpose of the study is to develop an in silico model for mass transfer and absorption in the human gastrointestinal tract.

b. Importance of understanding mass transfer and absorption processes in drug delivery systems.

c. Existing models have limitations, so new model development is necessary.

d. In silico modeling allows for cost-effective and efficient research.

## Model Development:

a. Overview of the model structure and components.

b. Key elements include mass transfer, absorption, and permeability.

c. Model validation using experimental data from in vivo and in vitro studies.

d. Importance of considering physiological factors such as pH, enzymes, and gut motility.

## Model Applications:

a. Potential use cases for the model in pharmaceutical research and development.

b. Examples include optimizing drug delivery systems, understanding drug-drug interactions, and evaluating the effects of food on drug absorption.

c. Importance of considering individual variability and patient factors.

d. Model can be used to predict adverse events and support personalized medicine approaches.

## Conclusion:

a. In silico modeling has the potential to revolutionize pharmaceutical research and development.

b. The developed model provides a valuable tool for understanding mass transfer and absorption in the human gastrointestinal tract.

c. Future improvements and expansions of the model are necessary to address remaining limitations and uncertainties.

## Key Takeaways:

1. In silico modeling can revolutionize pharmaceutical research and development.
2. The developed model provides a valuable tool for understanding mass transfer and absorption in the human gastrointestinal tract.
3. Future improvements and expansions of the model are necessary to address remaining limitations and uncertainties.