

## **A new in vitro Model for Testing Drug Permeation of New Aerosol Formulations: the Pharmaceutical Aerosol Deposition Device On Cell Cultures (PADDOCC)**

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New aerosol medicines have to be tested for safety and efficacy by animal experiments. Based on the 3R principle of animal welfare there is a demand in in vitro test systems to determine the efficacy of these aerosols, but they are rarely developed. Due to the complexity of the processes which are involved in the inhalation process, animal models are used by default. Besides ethical concerns these models often lack of inter-species differences. Therefore in vitro test systems should be based on human cells to ensure species-specific results.

We developed a new **P**harmaceutical **A**erosol **D**eposition **D**evice **O**n **C**ell **C**ultures (PADDOCC) to mimic the inhalation of a single metered aerosol dose and its subsequent deposition on filter-grown pulmonary epithelial cell monolayers exposed to an air interface. In first experiments the reproducibility of deposition with commercially available dry powder inhalers could be demonstrated as well as subsequent transport studies across human bronchial epithelial monolayers.

PADDOCC appears as an attractive alternative to animal testing in developing aerosol medicines, allowing the investigation on drug permeation, but at least it will be possible to reduce the number of animals in such studies.