



## RCPE

### Research Center Pharmaceutical Engineering

Programme: COMET – Competence Centers for Excellent Technologies

Programme Line: K1-Centres

COMET-Individual Project, Duration and Project Type:

01/2009 – 12/2010, strategic/ multi-firm

## Printable Medicine

Since 75% of participants of clinical trials for drug development are male, conventional medications often fail to have the desired effect or even have an adverse effect on the patient. The production of personalized medicines allows to individually tailor the drug dosage to the patient's needs, taking into account patient-specific factors to achieve the best treatment result.



### Age, height and weight influence drug efficacy

The term "personalized medicine" stands for drugs and therapies that are specifically tailored to the individual patient and his/her individual disease. It is known that such factors as age, gender, height and weight, as well as nutrition and environment, have a great impact on the effect of medications.

Since the active ingredient content of traditional medicines is typically fixed, women and older people often receive an over- or under-dose, which may decrease the effect of drug medium and cause side effects. To prevent incorrect dosing, the dose of active ingredient has to be tailored to the respective patient.



### New process for individual drug dosing

The aim of a research project that RCPE undertakes in collaboration with three institutes of the TU Graz (Institute of Fluid Mechanics and Heat Transfer, Institute of Paper, Pulp and Fiber Technology and Institute of Process and Particle Engineering) and one institute of the Karl Franzens University (Institute of Pharmaceutical Knowledge-unions) is to develop a novel method of delivering an individualized and exact drug dose to the patient. A year ago, the idea of this novel method of personalized drug dosing was introduced to patents and will be implemented long-term in hospitals and pharmacies.

The method of producing individually dosed drugs is based on a process in which all the required active ingredients and excipients of the drug are directly printed on a special edible paper used as carrier material. The printing method functions by means of the Drop-on-Demand (DOD) technique for ink jet printers, which applies electrical voltage to press ink through a fine nozzle. Depending on the nozzle

diameter and the magnitude of the applied electric pulse, the drop volume of the droplet formation can precisely be controlled. This way, an exact dosage of the so-called micro-drops with volumes of 5-500  $\mu$ l is possible and active ingredient solutions and suspensions may be dosed precisely, exactly and evenly. The printed paper can be rolled up, placed into a gelatine capsule and taken by the patient.

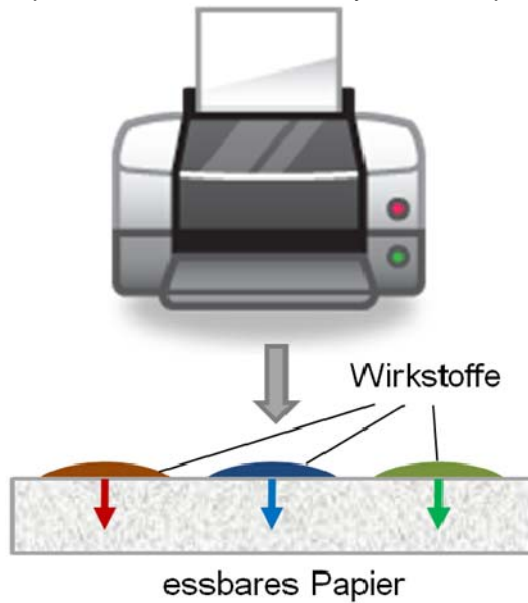


Fig. 1: Imprint of active pharmaceutical ingredients © RCPE

Another advantage of this technology is that several active substances can simultaneously be applied to a paper strip. This will reduce the number of drugs that has to be taken per day and help to control the interactions between individual drugs better.

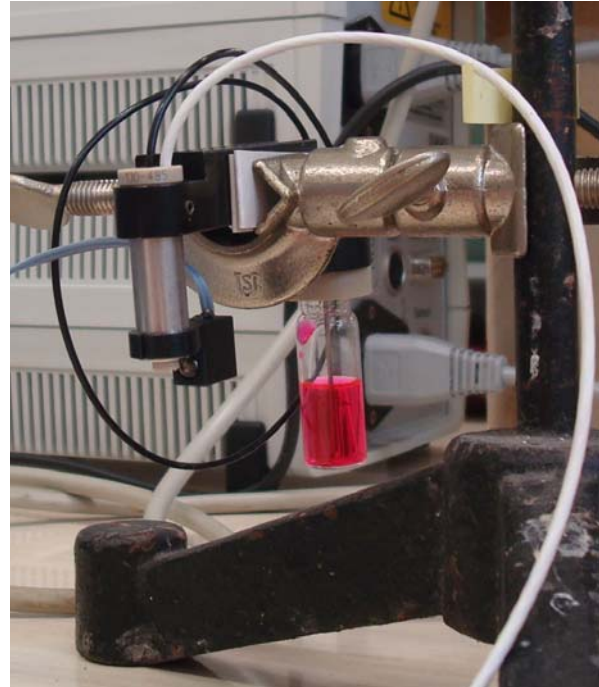


Fig. 2: Micro-drop dosing © RCPE

### Impact and Effects



#### Contact and information

K1-Zentrum RCPE

Research Center Pharmaceutical Engineering  
 Infeldgasse 13/II, 8010 Graz  
 T +43 316 873 30901  
 M office@rcpe.at, www.rcpe.at

#### Project coordinator

Univ. Prof. DI Dr. Johannes Khinast

#### Project Partners

Organisation	Country
Dr.-Franz-Feuerstein GmbH	Austria
Institute of Fluid Mechanics and Heat Transfer, Graz University of Technology	Austria
Institute of Paper, Pulp and Fiber Technology, Graz University of Technology	Austria
Institute of Process and Particle Engineering, Graz University of Technology	Austria
Institute of Pharmaceutical Knowledge-unions, Karl Franzens University of Graz	Austria

Weitere Informationen zu COMET – Competence Centers for Excellent Technologies: [www.ffg.at/comet](http://www.ffg.at/comet)

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