

# Drug delivery related to metabolites in human breath – first results of long term clinical studies using MCC/IMS

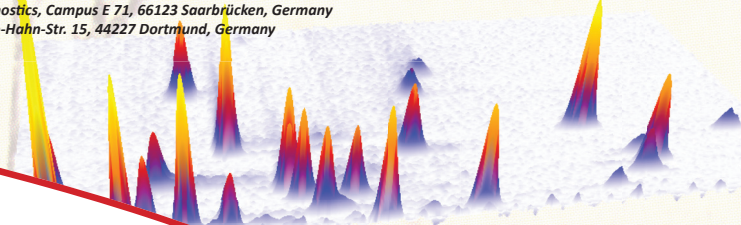
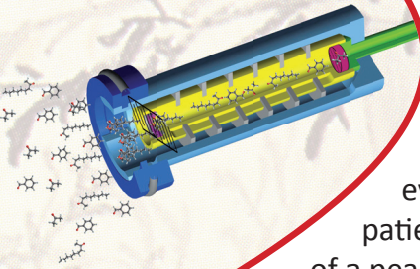
M. Westhoff<sup>1</sup>, P. Litterst<sup>1</sup>, S. Maddula<sup>2</sup>, J.I. Baumbach<sup>2,3</sup>

<sup>1</sup> Lung Clinic Hemer, Theo-Funckius-Str. 1, 58675 Hemer, Germany

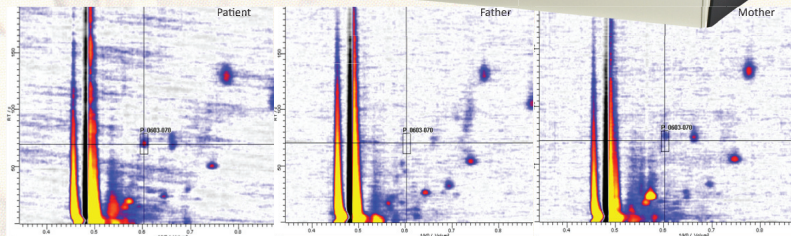
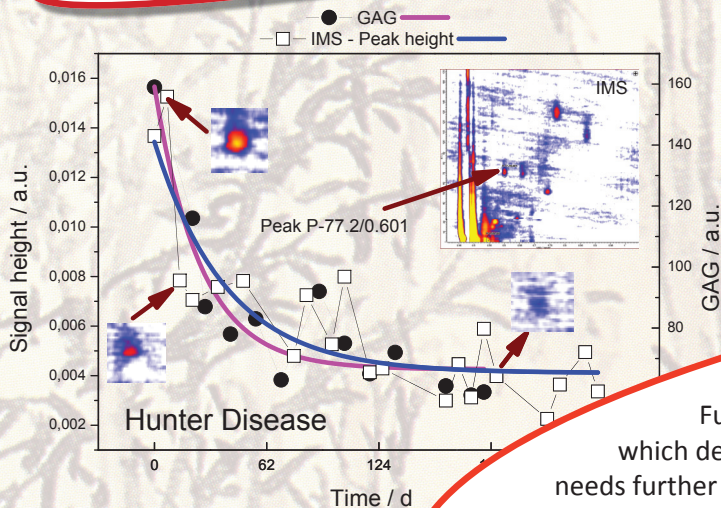
<sup>2</sup> KIST Europe, Department Microfluidics and Clinical Diagnostics, Campus E 71, 66123 Saarbrücken, Germany

<sup>3</sup> B&S Analytik, BioMedicalCenter Dortmund, Otto-Hahn-Str. 15, 44227 Dortmund, Germany

Hunter disease is a mucopolysaccharidosis for which enzyme replacement therapy with idursulfase has been offered for 3 years. Therapy can be monitored by the urinary concentration of dermatan sulfate and heparin sulfate. A 38-year-old male person suffering from Hunter disease has been treated with idursulfase for a year, showing dramatic clinical improvement. Additionally, the patient had breath analysis using MCC/IMS every week before enzyme replacement. The patient showed increasing concentrations of a peak P-1.5/0.547 which is related to acetone [67-64-1] over the time.



Part of a IMS-Chromatogram of human breath



The concentrations were higher than the concentrations of all patients ever tested with MCC/IMS. Furthermore, a peak P-77.2/0.601 was found, which decreased after few weeks of therapy and needs further biochemical characterisation.

Parallel GC/MSD investigations suggest (S)-(+)-6-Methyl-1-octanol [110453-78-6], Cyclohexanone, 5-methyl-2-(1-methylethyl)- [10458-14-7], Benzaldehyde, 2,5-dimethyl- [5779-94-2], Ethanone, 1-(4-methylphenyl)- [122-00-9], Dodecane [112-40-3] or Decanal [112-31-2].

These preliminary data show that breath analysis in patients with metabolic disorders might give further information about metabolism, especially under enzyme replacement therapy.

#### Acknowledgements

The financial support of the Ministry of Education, Science and Technology (MEST) of the Republic Korea is acknowledged thankfully. Part of the work on this paper has been supported by Deutsche Forschungsgemeinschaft (DFG) within the Collaborative Research Center (Sonderforschungsbereich) SFB 876 „Providing Information by Resource-Constrained Analysis“, project TB1 “Resource-Constrained Analysis of Spectrometry Data”.

In addition, the work was supported partly by the German Federal Ministry of Economics and Technology based on a decision of the German Bundestag within the project KF2368102AKO.

The experimental work described was carried out partly at ISAS Dortmund, Germany.

