UNI
BASEL

ANNUAL REPORT 2000

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INSTITUTE OF PHARMACEUTICAL TECHNOLOGY UNIVERSITY OF BASEL

INSTITUTE STAFF (5 DEC. 2000)

Hans Leuenberger, PhD
Professor of Pharmaceutical Technology

Georgios Imanidis, PhD
Private Docent of Pharmaceutical Technology

Christina Erb
Secretariate

Sonja Reutlinger
Laboratory assistant

Stefan Winzap
Technical and administrative assistant

EXTERNAL DOCENTS

Danièlle Giron, PhD, Private Docent (PD), Novartis Pharma, Basel

Theodor Güntert, PhD, Professor of Biopharmaceutics, Roche, Basel

Peter van Hoogevest, PhD, Private Docent (PD) Phares Ltd, Muttenz

Stephan Marrer, PhD, Roche, Basel

Ottheinrich Eichhorst, PhD, Liestal

Klaus Eichler, TTC (Technology Training Centre, Binzen BRD

Claudia Reinke, PhD, MedServices, Basel

ANNUAL REPORT 2000

PRESENTATION OF THE INSTITUTE

A. ORGANISATION

The Institute of Pharmaceutical Technology (Head: H.Leuenberger) is part of the Department of Pharmacy of the University of Basel. The Department of Pharmacy of the University of Basel [Uni BS] forms together with the Institute of Pharmacy of the Federal Institute of Technology Zürich [ETHZ] the Centre of Pharmaceutical Sciences of Uni BS and ETHZ. (See organigram in the attachment).

B. LOCATION

Basel, home of the world famous pharmaceutical companies Novartis Pharma and Roche, provides an excellent environment for research and teaching in pharmaceutical sciences.

The Institute of Pharmaceutical Technology is located on the second and partially on the third floor of the Pharmacentre of the University of Basel. A special research laboratory for Powder and New Process Technology is within walking distance at the Mühlhauserstrasse 50.

C. MISSION

The mission of the Institute of Pharmaceutical Technology is defined as follows:

Excellent Teaching and Research in Pharmaceutical Technology which shall permit the student to follow a career in academic or in pharmaceutical industry or in related fields such as hospital pharmacy, retail pharmacy or governmental health offices, based on a Basel University Diploma in Pharmaceutical Sciences and/or a Federal Diploma as a Pharmacist (mandatory for retail, hospital pharmacy) and/or a PhD in Pharmaceutical Sciences (in general mandatory for a career in academia, industry).

D. TEACHING

D. 1. Undergraduate Teaching (Diploma students)

For the preparation of the diploma work (21 weeks) the following courses, including practical laboratory training work, are offered:

Liquid-sterile Dosage Forms

Semi-solid Dosage Forms

Solid Dosage Forms

Quality assurance and GMP topics are included in the Seminar „Pharmaceutical Technology" which complements the contents of the courses mentioned. In addition, the seminar is designed for the training of the presentation skills.

Number of students per course: 30 - 50. Within the following three years, it is planned to update the

courses taking into account new learning technologies and to have the theoretical courses available in German, English and Russian language.*

D. 2. Postgraduate Teaching

D.2.1 CEIP-Courses, Head: PD Dr.G.Imanidis

CEIP [Continuing Education in Industrial Pharmacy] are offered for PhD Students as part of past-graduate education and for participants from the pharmaceutical industry. The concept of CEIP-program is reviewed each year and includes in general specialist from the pharmaceutical industry in the teaching staff. As focus of the CEIP-program was chosen GMP, i.e.

Good Manufacturing Practice - GMP2000.
Pharmacentre, University of Basel, 17 and 18 October 2000.

D.2.2 Co-operation with the TTC (Technology Training Centre), Binzen

The Glatt Croup has established a special Technology Training Centre [TTC] at the Binzen Facility, Germany. Binzen is located close to Lörrach and can be reached easily with the highway from Basel in ca. 20 minutes. The Institute of Pharmaceutical Technology has a close co-operation with Klaus Eichler, head of the TTC.
The program of TTC is available at the following Web Site: http://www.glatt.de/ttc/index-d.htm.
In case, that the courses are not overbooked a limited number of PhD students can participate at the individual courses. The participation at these courses is counted as part of postgraduate education of PhD students in Pharmaceutical Technology.

D.2.3 Postgraduate education in cooperation with the Federal Institute of Technology (ETH) Zürich

In the area of postgraduate education the Centre of Pharmaceutical Sciences, i.e. the cooperation between the Department of Pharmacy of the University of Basel and the Institute of Pharmacy at the Federal Institute of Technology plans an extensive program. Since 1996, Dr.G.Imanidis and Dr.S.Marrer have organised together with Dr.A.Beck-Sickinger (ETHZ) special postgraduate courses in Quality Assurance.

- A.Beck-Sickinger, S.Marrer and G.Imanidis. Quality Assurance in the Development, Production, Control and Registration of Peptides and Proteins (Editorial). *Pharm.Acta Helv.* **71:**381 (1996).
- A.Beck-Sickinger, G.Imanidis and S.Marrer. Quality Assurance in Computer Validation Systems (Editorial). *Pharm.Acta Helv.* **72:**315 (1998).
- A.Beck-Sickinger, G.Imanidis and S.Marrer. Externe und interne Inspektionen von Qualitätssicherungssystemen (Editorial). *Pharm.Ind.* **61:**1075 (1999).

* The Institute of Pharmaceutical Technology is a member of GPEN (Global Pharmaceutical Education Network) http://www.hbc.ukans.edu/phch/gpen.htm

E. RESEARCH

The research work is mainly conducted by PhD (>20) and diploma students (ca 10 per year) in the laboratories of the Institute of Pharmaceutical Technology or the Pharmaceutical Industry (Novartis Pharma, Roche or small and medium sized enterprises, including start-up companies) or in the labs of the Glatt Group (Manufacturer of Pharma Process Technology Equipment).

Research work is supervised by the Faculty of the Institute of Pharmaceutical Technology and is in general supported by the National Science Foundation of Switzerland, by private grants or by grants offered by the industry.

The research, which is conducted outside the Pharmacentre in privately owned laboratories, is usually supervised by a specialist on site, who keeps close contacts wit the Faculty of the Institute of Pharm. Technology. The PhD-students in the Pharmacentre have part-time the function as teaching assistants. Diploma thesis work can be done in connection with a research project at the Pharmacentre or in the industry.

More than 95% of PhD students, who have completed their studies at the Institute of Pharmaceutical technology, work later in the industry.

E. 1. Research Areas

E.1.1 Main Areas

- Application of Percolation Theory and Fractal Geometry in the Area of Pharmaceutical Technology (H. Leuenberger)
- New Process Technologies for the Manufacture of Solid Dosage forms (Powder Technology Projects, 'Time to Market'-Concepts etc.) including the production of Nanocomposite Systems (H.Leuenberger)
- Experimental Design, Surface Response Methodology, Artificial Neural Networks, Expert Systems (H. Leuenberger)
- Drug Transport through Biological and Artificial Biological Membranes (G.Imanidis)
- Passive and Ionthophoretic Transdermal Dosage Forms (G.Imanidis)
- Nanoscience and Nanotechnology (H.Leuenberger, G.Imanidis)
- Co-operative Projects (various topics) with the Industry (H.Leuenberger, G.Imanidis)

E. 2. Important Research Papers

E.2.1 Application of Percolation Theory and Fractal Geometry

- Percolation Theory, Fractal Geometry and Dosage Form Design, H.Leuenberger, L.Holman, M.Usteri and S.Winzap, *Pharm.Acta Helvetiae* **64:**34-39 (1989).
- The application of percolation theory in powder technology (Invited review), Hans Leuenberger, *Advanced Powder Technology* **10:**323-353 (1999)

E.2.2 New Process Technologies

- Granulation and Drying in Vacuum Fluidised Bed Systems,, B.Luy, B.Hirschfeld and H.Leuenberger, *Drugs made in Germany* **32:**3-8 (1989).
- Atmospheric Spry Freeze Drying: a suitable alternative in freeze drying technology, M.Mummenthaler and H.Leuenberger, *Inst.Journal of Pharm*. **72:**97-110 (1991)
- Development of a new plant for quasi-continuous granulation and multiple chambered fluid-bed drying of pharmaceutical granules, B.Dörr and H.Leuenberger. Pre-prints of the 1st European Symposium: Process Technology in Pharmaceutical and Nutritional Sciences (Editor: H.Leuenberger, Basel), ISBN 3-921590-55-8, PARTEC 98, Nürnberg, March 10-12, 1998, p. 247-256.

E.2.3 Experimental Design; Surface Response Methodology Artificial Neural Networks; Expert Systems

- A Factorial Design for Compatibility Studies in Preformulation Work, H.Leuenberger and W.Becher, *Pharm.Acta Helv.* **50:**88-91 (1975).
- Mathematische Modellierung und Optimierung pharmazeutisch-technologischer Qualitätsmerkmale fester Arzneiformen, H.Leuenberger, P.Guitard und H.Sucker, *Pharmazie in unserer Zeit* **5:**65-76 (1976).
- Basic Concepts of Artificial Neural Networks (ANN) Modelling in the Application to Pharmaceutical Development, J.Bourquin, H.Schmidlin, P.vanHoogevest and H.Leuenberger, *Pharm.Development and Technology* **2:**95-109 (1997).

E.2.4 Drug Delivery through Biological and Artificial Membranes

- G.Imanidis, K.C.Hartner and N.A.Mazer. Intestinal Permeation and Metabolism of a Model Peptide (Leuprolide) and Mechanisms of Permeation Enhancement by Non-Ionic Surfactants. *Int.J.Pharm.* **120:**41-50 (1995).
- G.Imanidis, C.Waldner, C.Mettler and H.Leuenberger. An Improved Diffusion Cell Design for Determining Drug Transport Parameters across Cultured Cell Monolayers. *J.Pharm.Sci.* **85:**1196-1203 (1996).
- G.Imanidis, S.Helbing-Strausak, R.Imboden and H.Leuenberger. Vehicle-dependent *In Situ* Modification of Membrane-controlled Drug Release. *J.Control.Release* **51:**23-34 (1998).
- R.Imboden and G.Imanidis. Effect of the Amphoteric Properties of Salbutamol on its Release Rate through a Polypropylene Control Membrane. *Eur.J.Pharm.Biopharm.* **47:**161-167 (1999).

E. 3. Suggested Further Reading

E.3.1 Application of Percolation Theory and Fractal Geometry

- Fractal Dimension of Porous Solid Dosage Forms, M.Usteri, J.D.Bonny and H.Leuenberger *Pharm.Acta Helv*. **65:**Nr. 2 (1990): 55-61.
- Formation of a Tablet: A Site-Bond Percolation Phenomenon, H.Leuenberger and R.Leu *J.Pharm.Sci*. **81:**Nr. 10 (1992): 976-982.
- Matrix-Type Controlled Release Systems: I. Effect of Percolation on Drug Dissolution Kinetics, J.D.Bonny and H.Leuenberger *Pharm.Acta Helv*. **68:**(1993): 25-33.
- Percolation Effects in Matrix-Type Controlled Drug Release Systems, H.Leuenberger, J.D.Bonny, M.Kolb *Int.J.of Pharm*. **115:**(1995): 217-224.

- Use of Percolation Theory to Interpret Water Uptake, Disintegration Time and Intrinsic Dissolution Rate of Tablets Consisting of Binary Mixtures, R.Luginbühl and H.Leuenberger *Pharm.Acta Helv.* **69:**(1994): 127-134.
- Percolation Theory and Robust Formulations in Powder Technology, H. Leuenberger in Proceedings '96 China-Japan Symposium on Particuology edited by Yong Jin, Mooson Kwauk, Genji Jimbo and Yasuo Konseka, Tsinghua University Beijing May 24-25, 1996.

E.3.2 Process Technology/Solid Dosage Form Design

- Theory of the Granulating Liquid Requirement in the Conventional Granulation Process, H.Leuenberger, H.P.Bier and H.Sucker *Pharm.Techn.Intern.* **3:**(1979): 60-67.
- Scale-up of Granulation Processes with -Reference to Process Monitoring, Acta Pharm. Techn. **2:**(1983): 274-280.
- Monitoring Mass Transfer Processes in order to control moist agglomeration, H.Leuenberger and G.Imanidis *Pharm.Techn.* **10:**(1986): 56 - 73
- Monitoring the Granulation Process: Granulate Growth, Fractal Dimensionality and Percolation Threshold, H.Leuenberger, M.Usteri, G.Imanidis and S.Winzap Boll. Chim. Pharm. **128:**(1989): 54-61.
- Agglomeration of Binary Mixtures in a High-Speed Mixer, M.Usteri and H.Leuenberger *Int.J.of Pharm.* **55:**(1989): 135-141.
- Design and Modification of Powders - A Must in Pharm. Technology, H.Leuenberger Proceed. 2nd World Congress Particle Technology, Sept. 19-22, 1990, Kyoto, Japan Vol. III. p. 317-328, The Society of Powder Technology, Japan.
- Design and Optimisation Approaches in the Field of Granulation, Drying and Coating, H.Leuenberger Pharmacy World Congress '93, Tokyo, Proceed. of the 53rd Int. Congress of Pharm. Sciences 1993, D.J.S.Crommelin, K.K.Midha, T.Nagai editors, Medpharm. Scientific Publishers, Stuttgart 1994, p. 493-511.

E.3.3 New Process Technologies

- Prozess Monitoring bei der Emulsionsherstellung Drehmomentenmessung als In Prozess Kontrolle bei der Emulsionsherstellung, R.Randegger, G.Imanidis, R.D.Juch, G.Birrenbach, H.Leuenberger *Pharm.Ind.* **56:**(1994): 648-654
- Wet spherical agglomeration of proteins as a new method to prepare parenteral fast soluble dosage forms, A.Bausch and H.Leuenberger *Int.J.of Pharm.* **101:**(1994): 63-70
- List of Preparation of Liposomes Encapsulating Water Soluble Compounds Using Supercritical Carbon Dioxide, L.Frederiksen, K.Anton, P.vanHoogevest, H.R.Keller and H.Leuenberger *J.Pharm.Sci.* **86:**(1997): 921 –928

E.3.4 Drug Delivery through Biological and Artificial Membranes

- P.Lütolf, G.Imanidis and H.Leuenberger. Transdermal Iontophoresis of an Amphoteric Compound: Effect of Charge and Interaction with Human Skin, In: P.Couvreur, D.Duchéne, P.Green and H.E.Junginger (Eds.), Transdermal Administration, A Case Study, Iontophoresis, Editions de Santé, Paris, 1997, pp. 360-364.
- G.Imanidis and R.Imboden. Utilizing Vehicle Imbibition by a Microporous Membrane and Vehicle Viscosity to Control Release Rate of Salbutamol, *Eur. J. Pharm. Biopharm.* **47:**283-287 (1999).
- F.P.Schwarb, G.Imanidis, E.W.Smith, J.M.Haigh and C.Surber. Effect of Concentration and Degree of Saturation of Topical Fluocinonide Formulations on *In Vitro* Membrane Transport and *In Vivo* Bioavailability on Human Skin. *Pharm. Res.* **16:**909-915 (1999).

E. 4. Publications: Institute of Pharmaceutical Technology 1995-1999

Modeling of Drug Release from Polymer Matrices: Effect of Drug Loading	Silvia Kocova El Arini and Hans Leuenberger	*Int. Journal of Pharmaceutics* **121:**(1995) 141-148
Behavioral aspects of travelers in their use of malaria presumptive treatment	P.Schlagenhauf, R.Steffen, A.Tschopp, P.Van Damme, M.-L.Mittelholzer, H.Leuenberger & C.Reinke	*Bulletin of the World Health Organization*, 1995, **73:**(2) 1-7
Albumin Nanospheres as Carriers for Passive Drug Targeting: An Optimized Manufacturing Technique	Bernhard G. Müller, Hans Leuenberger and Thomas Kissel	*Pharm. Res.* **13:**(1), 32-37 (1996)
Pharmaceutical technology and quality assurance: the impact of novel concepts in the production of granules and tablets	H.Leuenberger	International Meeting on Chemical Engineering and Biotechnology, Proceedings ACHEMASIA '95, 16/5/95, Peking, China
Membrane modulated dissolution of oral drug delivery systems	Louis Savastano, Hans Leuenberger, Hans Peter Merkle	*Pharmaceutica Acta Helvetiae* **70:**(1995) 117-124
Intestinal Permeation and Metabolism of a Model Peptide (Leuprolide) and Mechanisms of Permeation Enhancement by Non-Ionic Surfactants	G.Imanidis, K.C.Hartner and N.A.Mazer	*Int. J. Pharm.* **120:**41-50 (1995)
Zero-order release periods in inert matrices. Influence of the distance to the percolation threshold	Isidoro Caraballo, Monica Millan, Antonio Rabasco and Hans Leuenberger	*Pharm. Acta Helv.* **71:**(5) (1996) 335-339
Percolation Theory and Robust Formulations in Powder Technology	H.Leuenberger	Proceedings '96 China-Japanese Symposium on Particuology (May 24/25 1996 Beijing) edited by Yong Jin, Mooson Kwauk, Genji Jimbo, Yasuo Kousaka, p. 37-41
Dissolution properties of praziquantel-β-cyclodextrin systems	Silvia Kocova El Arini and Hans Leuenberger	*Pharmaceutical Development and Technology*, **1:**(3), 307-315 (1996)
Study of percolation thresholds in ternary tablets	I.Caraballo, M.Fernández-Arévolo, M.Millán, A.M.Rabasco, H.Leuenberger	*International Journal of Pharmaceutics* **139:**(1996): 177-186
An Improved Diffusion Cell Design for Determining Drug Transport Parameters across Cultured Cell Monolayers	Georg Imanidis, Christop Waldner, Christop Mettler, and Hans Leuenberger	*Journal of Pharmaceutical Sciences*, Vo. **85:**No. 11, November 1996, 1196-1203
An Improved Diffusion Cell Design for Determining Drug Transport Parameters Across Cultured Cell Monolayers	G.Imanidis, C.Waldner, C.Mettler and H.Leuenberger	*J. Pharm. Sci.* **85:**1196-1203 (1996)

Quality Assurance in the Development, Production, Control and Registration of Peptides and Proteins (Editorial)	A.Beck-Sickinger, S.Marrer and G.Imanidis	*Pharm. Acta Helv.* **71:**381 (1996)
Percolation theory and physics of compression	Hans Leuenberger and Lotti Ineichen	*European Journal of Pharmaceutics and Biopharmaceutics* **44:**(1997) 269-272
Basic Concepts of Artificial Neural Networks (ANN) Modeling in the Application to Pharmaceutical Development	Jacques Bourquin, Heinz Schmidli, Peter van Hoogevest and Hans Leuenberger	*Pharmaceutical Development and Technology*, **2:**(2), 95-109 (1997)
Application of Artificial Neural Networks (ANN) in the Development of Solid Dosage Forms	Jacques Bourquin, Heinz Schmidli, Peter van Hoogevest and Hans Leuenberger	*Pharmaceutical Development and Technology*, **2:**(2), 111-121 (1997)
Flow-cytometric investigation of cellular metabolism during oxidative stress and the effect of tocopherol	S.Amann, C.Reinke, G.Valet, U.Moser, H.Leuenberger	*Internat. J.Vit. Nutr.Res,* **69:**(5), 356-361 (1999)
Transdermal Iontophoresis of an Amphoteric Compound: Effect of Charge and Interaction with Human Skin	P.Lütolf, G.Imanidis and H.Leuenberger	In Transdermal Administration, A Case Study Iontophoresis. pp 360-364, ISBN 2-86411-110-1. Editors: P.Couvreur. D.Duchêne, P.Green, H.Junginger. Edition de Santé Paris 1997
Preparation of Liposomes Encapsulating Water-Soluble Compounds Using Supercritical Carbon Dioxide	Lene Frederiksen, Klaus Anton, Peter van Hoogevest, Hans Rudolf Keller and Hans Leuenberger	*Journal of Pharmaceutical Sciences*, **86**:(8), August 1997: 921-928
Transdermal Iontophoresis of an Amphoteric Compound: Effect of Charge and Interaction with Human Skin	P.Lütolf, G.Imanidis and H.Leuenberger	In: P.Couvreur, D.Duchéne, P.Green and H.E.Junginger (Eds.), Transdermal Administration, A Case Study, Iontophoresis, Editions de Santé, Paris, 1997, pp. 360-364
How to Monitor and Control the Moist Agglomeration Process	H.Leuenberger	Book Chapter in „Data Acquisition and Measurement Techniques", ed. Angel Muñoz-Ruiz. Interpharm Press Inc., Buffalo Grove, Illinois, ISBN 1-57491-037-X, p. 141-157, 1998
Modified Young's Modulus of Microcrystalline Cellulose Tablets and the Directed Continuum Percolation Model	Martin Kuentz and Hans Leuenberger	*Pharm. Development and Technology*, **3:**(1), 13-19 (1998)
Effects of Formulation and Process Variables on the Aggregation of Freeze-Dried Interleukin-6 (IL-6) After Lyophilization and on Storage	Barbara Lückel, Bernhard Helk, David Bodmer, H. Leuenberger	*Pharmaceutical Development and Technology*, **3:**(3), 337-346 (1998)

Formulations of Sugars with Amino Acids or Mannitol - Influence of Concentration Ratio on the Properties of the Freeze-Concentrate and the Lyophilizate	Barbara Lückel, David Bodmer, Bernhard Helk, H. Leuenberger	*Pharmaceutical Development and Technology*, **3:**(3), 325-336 (1998)
Dissolution Properties of Praziquantel - PVP Systems	Silvia Kocova El Arini and Hans Leuenberger	*Pharm. Acta Helv.* **73:** (1998) 89-94
Solubility Properties of Racemic Praziquantel and its Enantiomers	S.Kocova, D.Giron and H.Leuenberger	*Pharm. Development and Technology*, **3:**(4), 557-564 (1998)
Solubility of Praziquantel-Polymer Complexes and Solid Solutions, and Praziquantel Optical Enantiomers	Silvia Kocova El Arini, Danièle Giron and Hans Leuenberger	*Pharm. Development and Technology*, **3:**(4), 557-564 (1998)
Vehicle-dependent in situ modification of membrane-controlled drug release	G.Imanidis, S.Helbing-Strausak, R.Imboden, H.Leuenberger	*Journal of Controlled Release* **51:**(1998) 23-34
Development of a quasi-continuous production line for granules – a concept to avoid scale-up problems	B.Dörr, H.Leuenberger	Preprints, 1st European Symposium Process Technology in Pharmaceutical and Nutritional Sciences, PARTEC 98, Nürnberg, 10-12 March 1998. (H. Leuenberger, editor) ISBN 3-921-590-55-8, p. 247-256
Relationship between fine Particle Fraction and Percentage of Drug Retained after Air Jet Sieving of Model Carrier-Based Salbutamol Dry Powders for Inhalation	L.-M.Fueg, K.Iida, H.Leuenberger, R.Müller-Walz	In Drug Delivery to the Lungs IX, The Aerosol Society, ISBN 0 9529777 02, Westminster, London, p. 64-67 (1998)
Vehicle-dependent *In Situ* Modification of Membrane-controlled Drug Release	G.Imanidis, S.Helbing-Strausak, R.Imboden and H.Leuenberger	*J. Control. Release* **51:**23-34 (1998)
Quality Assurance in Computer Validation Systems (Editorial)	A.Beck-Sickinger, G.Imanidis and S.Marrer	*Pharm. Acta Helv.* **72:**315 (1998)
Fracture in disordered media and tensile strength of microcrystalline cellulose tablets at low relative densities	Martin Kuentz, Hans Leuenberger, M.Kolb	*Int. J. of Pharmaceutics* **182:**(1999); 243-255
Pressure-susceptibility of polymer tablets as a critical property: A modified Heckel equation	Martin Kuentz, Hans Leuenberger	*J. Pharm. Sciences*, **88:**(1999), 174-179
Percolation theory, conductivity and dissolution of hydrophilic suppository bases (PEG systems)	Christian Siegmund, Hans Leuenberger	*International Journal of Pharmaceutics*, **189:**(1999) 187-196

Effect of the Amphoteric Properties of Salbutamol on its Release Rate through a Polypropylene Control Membrane	R.Imboden and G.Imanidis	*Eur. J. Pharm. Biopharm.* **47:**161-167 (1999)
Utilizing Vehicle Imbibition by a Microporous Membrane and Vehicle Viscosity to Control Release Rate of Salbutamol	G.Imanidis and R.Imboden	*Eur. J. Pharm. Biopharm.* **47:**283-287 (1999)
Effect of Concentration and Degree of Saturation of Topical Fluocinonide Formulations on *In Vitro* Membrane Transport and *In Vivo* Bioavailability on Human Skin	F.P.Schwarb, G.Imanidis, E.W.Smith, J.M.Haigh and C.Surber	*Pharm. Res.* **16:**909-915 (1999)
Externe und interne Inspektionen von Qualitätssicherungssystemen (Editorial)	A.Beck-Sickinger, G.Imanidis and S.Marrer	*Pharm. Ind.* **61:**1075 (1999)
Effect of Separation Characteristics between Salbutamol Sulfate (SS) Particles and Model Carrier Excipients on Dry Powder for Inhalation	Kotaro Iida, Hans Leuenberger, Lise-Marie Fueg, Rudi Mueller-Walz, and Kazumi Danjo	*Journal of the Pharmaceutical Society of Japan* (Japanese), **119:**(10) 752-762 (1999)

E. 5. Publications 2000

Refereed Journals:

- A new model for the hardness of a compacted particle system, applied to tablets of pharmaceutical polymers, Martin Kuentz, Hans Leuenberger, *Powder Technol*. **111:**145-153 (2000)
- A new theoretical Approach to Tablet Strength of a Binary Mixture Consisting of a well and poorly compactable Substance, M.Kuentz and H.Leuenberger; *Eur.J. of Pharmaceutics and Biopharm*. **49:**(2000), 151-159.
- Kotaro Iida, Hans Leuenberger, Lise-Marie Fueg, Rudi Mueller-Walz, Hirokazu Okamoto, Kazumi Danjo: Effect of Mixing of Fine Carrier Particles on Dry Powder Inhalation Property of Salbutamol Sulphate (SS), *Journal of the Pharmaceutical Society of Japan* (Japanese), **120:**(1), 113-119 (2000)

Book Chapter

- Solubilization Systems - The Impact of Percolation Theory and Fractal Geometry, H.Leuenberger and Silvia Kocova El Arini. Book Chapter in: Water-Insoluble Drug Form. (2000), 569-607. Editor: Liu, Rong. Publisher: Interpharm Press

E. 6. Contribution by External Docents (see also attachment)

- Prof. Theodor Güntert, PhD, having important responsibilities in his job at Roche Basel is lecturing Biopharmaceutical and Pharmacokinetic topics and is supervising a tutorial with practical applications of Pharmacokinetic data. The list of his publications in 2000 can be found in the attachment.
- PD Danièlle Giron, PhD, is expert and head of the Thermoanalytic laboratory at Novartis Pharma Ltd. Her contribution teaching thermoanalytical topics and data bank retrieval topics is highly appreciated. Her publications are listed in the attachment.

- PD Peter van Hoogevest, PhD, is an expert in the formulation and the manufacture of liposomes. He recently became CEO of Phares Drug Development Ltd., Muttenz, a company specialised in liposomal technologies and applications. He is teaching liposomal related topics (including practical training) at the Institute of Pharmaceutical Technology.
- Stephan Marrer, PhD, head of Quality Assurance, is teaching Quality Assurance topics and is tutor in the seminar for Pharmaceutical Technology. He has submitted his scientific oeuvre at the Faculty of Natural Sciences to become Private Docent (PD) at the University of Basel.
- Ottheinrich Eichhorst, PhD, Dr. has completed his study as a Pharmacist in 1999 and started to collaborate in 2000 with the Institute of Pharmaceutical Technology (details see H. 1.5).
- Klaus Eichler is head of the Technology Training Centre at Glatt GmbH in Binzen, BRD. He is an excellent organiser and moderator of Meetings, Workshops and Symposia world-wide. The Institute of Pharm. Technology is proud of working with him for years.
- Claudia Reinke, PhD, is a biologist and pharmacist, who worked since the completion of her studies in Pharmacy for the Institute of Pharmaceutical Technology. She owns the Enterprise MedServices, Basel (for details see H. 1.5)

F. CURRICULUM VITAE

F. 1. G. Imanidis

	BORN
Georgios Imanidis, June 8, in Serres, Greece	1958
	EDUCATION
High school (gymnasium) education with emphasis on sciences in Serres, Greece	1973 – 1976
University admission examination	1976 June
Pharmacy studies at the Aristotelion University of Thessaloniki, Thessaloniki, Greece	1976 – 1980
Graduation with the Pharmacy degree	1980 Nov.
Post-graduate studies in Pharmaceutical Technology and Industrial Pharmacy at the „Pharmazeutisches Institut“ of the University of Basel, Basel, Switzerland	1980 – 1982
Advanced diploma in Pharmaceutical Technology,	1982 Dec.
Ph.D. thesis in Pharmaceutical Technology under the supervision of Prof. H. Leuenberger at the „Pharmazeutisches Institut“ of the University of Basel, Basel, Switzerland	1983 – 1986
Doctor of Philosophy degree	1986 Feb.
	PROFESSIONAL APPOINTMENTS
Part-time (50%) teaching assistant in Pharmaceutical Technology at the „Pharmazeutisches Institut“ of the University of Basel, Basel, Switzerland	1983 – 1986
Post-doctoral fellow in Drug Delivery Research under Prof. W.I. Higuchi in the Department of Pharmaceutics, University of Utah, Salt Lake City, UT, U.S.A.	1986 – 1988
Senior research scientist in the Department for Drug Absorption Studies, TheraTech, Inc., Salt Lake City, UT, U.S.A.	1988 – 1990
Adjunct staff scientist in the Department of Pharmaceutics, University of Utah, Salt Lake City, UT, U.S.A.	1988 – 1990
Recipient of a scholarship from the Roche Research Foundation to study drug absorption using cell cultures as an alternative to animal experiments at the „Pharmazeutisches Institut“ of the University of Basel, Switzerland	1991 – 1992
Scientific staff member, „habilitand“, and head teaching assistant at the „Pharmazeutisches Institut“ of the University of Basel, Department of Pharmaceutical Technology, Basel, Switzerland	1992 – 1999
Awarded the title of a docent „PD“ by the Faculty of Natural Sciences of the University of Basel through the process of „Habilitation“.	2000
Faculty member (full time) at the Institute of Pharmaceutical Technology, University of Basel, Switzerland	since 2000

F. 2. H. Leuenberger

EDUCATION	
Diploma in Experimental Physics (University of Basel)	1967
PhD-Thesis in Nuclear Physic (University of Basel)	1971
INDUSTRIAL CAREER	
Head of R+D Laboratory (Preformulation work) Analytical R+D Department, Sandoz Ltd., Basel	1971-1973
Research Group Leader, Pharmaceutical R+D, Sandoz Ltd., Basel	1973-1982
SABBATICALS AND EXPERIENCES ABROAD	
University of Hamburg (Prof. Dr. H. Sucker) Germany	1973
University of Michigan, Ann Arbor (Prof. Dr. W.I. Higuchi, Prof. Dr. N.F. Ho, Dr. E.W. Hiestand), U.S.A.	1979
Head Pharma R+D, Sandoz España, Barcelona ad interim (Spain).	1980
CAREER IN ACADEMIA	
Part Time Lecturer at the University of Basel as Private Docent (PD) in Pharmaceutical Technology	1980
Full-Time Ordinary Professor of Pharmaceutical Technology and Head of the Institute of Pharmacy at the University of Basel, Totengässlein 3, CH-4051 Basel (Historical Site close to the Museum)	1982
Planning of a new building for the Institute of Pharmacy	1982-2000
Member of the Export Group 12 (Pharmaceutical Technology) of the European Pharmaceutical Commission, Strasbourg, France	1988-1993
Dean of the Faculty of Natural Science at the University of Basel, Founder of the Faculty Committee of Department Heads	1994/95
President of the Scientific Council [SC] of the Swiss Academy of Engineering Science [SATW] and founder of the Lateral Think Tank of the SC	1992-96
Vice President of the Swiss Academy of Engineering Science (for further nominations and awards see chapter F) Member of Editorial Advisory Board (such as J.Pharm.Sci. 1990/92), Referee for different journals, Member of peer review committees: ETHZ (1993), University of Groningen and Utrecht (1997), Publications: more than 170, Patents: more than ten.	Since 1993
SWISS MILITARY SERVICE RECORD	
Expert Officer (Nuclear Physics) as A-Specialist, Chief Physicist and AC-Laboratory Chief (retired since 1993), President of AC-Specialists, Study Group (AGAS) 1978-1982.	
HOBBIES	
Research in Genealogy, President of the Basel Society of Genealogy and Heraldics 1973-1982, Tennis	
At the new Building and address: Pharmacentre, Klingelbergstrasse 50; 4056 Basel	Since 2000

F. 3. Research Awards, Medals, Nominations (Membership Awards)

H. Leuenberger, on behalf of the Institute of Pharmaceutical Technology:

❖ Member of Swiss Academy of Engineering Sciences since 1987.

❖ University of Helsinki Medal 1989.

❖ Fellow of the American Association of Pharmaceutical Scientists [AAPS] since 1990.

❖ AAPS Research Award in Pharmaceutical Technologies 1993.

❖ Innovation Award for New Process Technologies of the Governments Basel-City and Basel-Country 1994.

❖ Honorary Member of the Swiss Society of Industrial Pharmacists [GSIA] since 1994.

❖ Jörg Bider Medal of the Swiss Society of Pharmacists [SAV] 1997.

❖ Corresponding Member of the Royal Academy of Pharmacy of Spain since 1998.

❖ Foreign Member of the Russian Academy of Engineering Sciences since 1998.

❖ IPS Medal 2000 [Industrial Pharmacy Section] of FIP [Féderation International Pharmaceutique]. 2000.

❖ Member of the Advisory Board of the Grand École des Mines, Albi, France, since 2000.

G. Research and Co-operation Network

G. 1. Academia

China Pharmaceutical University, Nanjing, P.R. China*

Gifu Pharmaceutical University, Gifu Japan*

Federal Institute of Technology [ETH] Zürich*

Grand École des Mines, Albi, France*

Institute of Informatics, University of Basel

Mahidol University, Bangkok, Thailand*

Mendelev University of Chemical Technology of Russia [MUCTR], Moscow*

University of Freiburg i. Br. Material Science Institute, Germany

* Based on formal agreements.

University of Kansas, Lawrence, Kansas, USA*

University of Kuopio, Kuopio, Finland

University of Seville, Seville, Spain*

Princeton University, Princeton, N.J., USA

G. 2. Industrial Partners

ADD, Advanced Drug Delivery Technologies, Muttenz

Asulab AG, Neuchâtel

Bachem AG, Bubendorf

Capsugel Ltd., Arlesheim

Drossapharm AG, Arlesheim

Glatt AG, Pratteln

Glatt GmbH, Binzen, BRD

Glatt, System Techniques, Dresden, BRD

Mepha AG, Aesch

Novartis Pharma Ltd., Basel

Pentapharm AG, Aesch

Roche Ltd., Basel

Roche Ltd., Grenzach, BRD

Skye Pharma, Muttenz

Spirig AG, Egerkingen

H. PROGRESS REPORT 2000

H. 1. Special Events 2000

H.1.1 Promotion of Georgios Imanidis, PhD, Private Docent

Dr. Imanidis received in 2000 the VENIA LEGENDI of the University of Basel and has been promoted to become PD [Private Docent].

H.1.2 Promotion of Stefan Winzap, Chief Laboratory and Administrative Assistant

Stefan Winzap fulfils in the Institute of Pharmaceutical Technology the tasks of internal floor manager and was promoted to be a Chief Laboratory and Administrative Assistant.

H.1.3 H.Leuenberger, Recipient of IPS 2000 Medal of FIP

The Industrial Pharmacy Section [IPS] of FIP [Féderation International Pharmaceutique] decided to dedicate the IPS 2000 Award to the Head of the Institute of Pharmaceutical Technology of the University of Basel for the successful engagement in Industrial Research Projects and New Technologies.

H.1.4 Move of the Institute to the Pharmacentre and Inauguration of the New Laboratories.

The Institute of Pharmaceutical Technology moved its laboratories from the old location (Totengässlein 3, 4051 Basel) including the labs of Bäumlihofgymnasium to the new building and the lab at the Mühlhauserstrasse 50. The move was organised and co-ordinated by Stefan Winzap, who has done an excellent job. The author of this report (H.L.) would like to thank him, especially as well as the staff of our Institute, our PhD-candidates, assistants and our students. Without their help, it would have been just impossible to make this move.

H.1.5 Staff related topics

- Dr. Claudia Reinke, who has contributed as a Scientific Adjoint in an enormous way to the performance of the Institute of Pharmaceutical Technology started her own enterprise on January 1, 2000. We would like to thank her for her extremely valuable contributions as a former staff member and for her kindness to serve actually as an external docent without asking for a payment. Dr. Reinke is supervising the PhD-Thesis of M. Krabichler, who started on June 1, 2000 to continue the scientific work of Rahel Raess, who has completed her PhD studies. Dr. Claudia Reinke is also a member of the Scientific Council of the Swiss Academy of Engineering Sciences [SATW].
- Dr. Ottheinrich Eichhorst, Theoretical Physicist and Pharmacist, has joined our staff as an external docent. He is co-editor of the revised book „Physical Pharmacy". Wiss. Verlagsbuchhandlung, Stuttgart and has successfully supervised the diploma thesis work of Michael Lanz (CD-ROM with

mathematical models of Physical Pharmacy). We thank Dr. Eichhorst for his excellent contribution, which is free of charge for our Institute.

- René Gassner, craftsman, who joined the Institute of Pharmacy December 1, 1986 and completed his work in the Pharmacentre, took his retirement on July 31, 2000. He worked always very hard and loved to give a technical support to our students. We wish him an excellent time in his retirement.
- Sonja Reutlinger, laboratory assistant, joined our staff on September 18, 2000. She will contribute to our efforts for establishing excellence in laboratory research and teaching.

H. 2. Teaching

H.2.1 New Learning Technologies

Michael Lanz, a diploma thesis student, has successfully developed a CD-ROM with mathematical model equitation, which are used in the area of Physical Pharmacy and Biopharmaceutics. The program pursuits to visualise these equations as a function of the parameters of the mathematical model. Thus, the student gets a more comprehensive view of the idea and of the taste of such a mathematical model. With this CD-ROM a learning „by heart" of functions without an understanding of the meaning of such mathematical models should be avoided. The program on the CD-ROM with the collection of mathematical models will be made available to all students in the 4th and 5th year either by acquiring such a CD-ROM or by an intranet access to a location of our interactive website. The diploma thesis work has been supervised by O. Eichhorst, H. Leuenberger in co-operation with H. Burkhardt of the Institute of Informatics at the University of Basel. The CD-ROM will be part of the nearby edited book.

H.2.2 Co-operation with MUCTR†, Moscow, in the area of new learning technologies/Development of Curriculum

In connection with the National Science Foundation a co-operation with the Cybernetic Department of MUCTR, [Mendelyev's University of Chemical Technology of Russia] has been established do develop teaching and learning modules in english and in the Russian language. MUCTR wants to extend its teaching and research focus in the direction of pharmaceutical Technology, developing a corresponding curriculum. The grant (7IP 062613) given by the Swiss National Science Foundation covers the time period 1.10.2000 until 1.10.2002.

H.2.3 Expert-Systems for the Manufacturing of Capsule Formulations

The Institute of Pharmaceutical Technology of the University of Basel was invited in 2000 to join the international focus group to develop and expand the Expert Systems for the production of Capsules. Actually, the Expert Systems include more than 900 marketed formulations. The Institute of Pharmaceutical Technology will use this Expert System in the practical training of the students and will contribute to the further development of the Expert System with the application of statistical experimental design studies and the application of artificial neural networks [ANN] for the optimisation of Capsul Dosage Forms. The International Focus Group is co-ordinated by Capsugel Ltd. Arlesheim.

† D.MENDELEEV UNIVERSITY OF CHEMICAL TECHNOLOGY OF RUSSIA

H.2.4 New Curriculum / Diploma Studies

Due to the introduction of the new curriculum, the number of lectures in pharmaceutical technology had to be reduced by 25% and the time dedicated for practical laboratory training in pharmaceutical technology by 50%. This reduction was necessary to provide time in the final semester for the elaboration of a diploma work lasting 21 weeks. In the year 2000 ten students have completed this diploma work in the area of Pharmaceutical Technology. Diploma studies were performed in the Pharmacentre as well as in laboratories of partner institutions in industry (see H 2.5. List of diploma thesis students, topics and location).

H.2.5 List of Diploma Students with diploma thesis topics in Pharmaceutical Technology

Kuny Tanja	Wirkstofffreisetzungsprüfung mittels naher Infrarot-Spektroskopie	Roche
Lanz Michael	CD-ROM Formelsammlung Physikalische Pharmazie	Pharmazentrum
Miljojkovic Vesna	Untersuchung an liposomalen Membranen mittels Fluoreszenzspektroskopie	Pharmazentrum
Mirsaidi Reza	Lipophilieeinfluss auf den Peptidtransport bei transdermaler iontophoretischer Applikation	Pharmazentrum
Novakovic Mirela	Untersuchungen von 1- und 2-Propanol und ihrer Mischungen mit Wasser mittels Dielektrischer Spektroskopie	Pharmazentrum
Nowbakht Pegah	In vitro Studie über das Permeations- und Penetrationsvermögen von niedermolekularem Heparin durch die menschliche Haut	Pharmazentrum
Schmid Jeanette	Reinigungsvalidierung am Beispiel eines Labor-Spülautomaten	Institut für Spitalpharmazie
Trieu Ngoc-Dung	Transport von Etofenamat durch die Haut aus liposomalen Formulierungen	Pharmazentrum
Tchambaz Lydia	Abklärungen zu den physikalisch-chemischen Eigenschaften von Amentoflavon und dem Metabolismus und Transport durch Caco-2 Zellkulturen	Pharmazentrum
Wenger Olivier	Substrat-indizierte Mikrokristallisation	Solvias AG

H. 3. Research

H.3.1 General Remarks

Due to the move of the Institute of Pharmaceutical Technology from the old historical location at the Totengässlein 3, 4051 Basel to the new one at the Pharmacentre the productivity of publishing new papers in 2000 has been slowed down from eight (mean 1995-1999) to four. This slow-down is related in addition to the fact that now each year a higher number of diploma thesis students have to be supervised. However, the result of the diploma thesis work is available in the thesis only. These results need to be published together with the results of PhD thesises. Because the PhD students can find immediately after completing the studies a job in the pharmaceutical industry, there is a lack of permanent academic staff at the Institute to publish these results immediately. Often our PhD students have already signed a contract with the industry as job provider well ahead of their final oral exam.

H.3.2 List of Presentations as an Invited Speaker in the year 2000

Year 2000		Title
May 17 H. Leuenberger	Yamanouchi Pharmaceutical Co., Ltd., Yashi-Factory, Japan	A quasi-continuous production line to avoid Scale-up of the production of pharmaceutical granules
March 9 H. Leuenberger	Firma Henkel, Düsseldorf, BRD	Production of Nanocomposites using a spray freeze drying technique
March 13 H. Leuenberger	Particle Technology Day of IFPRI [International Fine Particle Research Institute]	Quasi-continuous production and drying of pharmaceutical granules – a concept to avoid scale-up problems
March 16-20 H. Leuenberger	Millennium Congress 2000, San Francisco, FIP [Féderation International Pharmaceutique]	Pharmaceutical Process Optimisation with Artificial Neural Networks
July 21-26 H. Leuenberger	POWREX 2000 Symposium, Osaka, Japan	Faster Time to Market, or how to avoid Scale up for Granule Production
July 27 H. Leuenberger	Meeting organised by the Ministry of Health and Welfare Japan, Osaka	How to avoid Scale-up in the Production of Pharmaceutical Granules
July 28 H. Leuenberger	Bayer Japan Ltd, Shiga-Factory, Japan	How to avoid Scale-up in the Production of Pharmaceutical Granules
July 31 H. Leuenberger	Otsuka, Pharmaceutical Ltd. Tokushima Pref., Shikoku-Island, Japan	How to avoid Scale-up in the Production of Pharmaceutical Granules
August 31 H. Leuenberger	FIP, Annual Symposium, Wien. Anlässlich der Verleihung der Medaille 2000 der Sektion der Industriepharmazeuten der FIP (IPS 2000 Medal)	Genomics, HTS, Megamergers-What next?

October 12-14 H. Leuenberger	10. Glatt Symposium Pharma Technologie, Prag, Tschechien	Multicell®, a quasi-continuous process to avoid scale-up for the production of pharmaceutical granules
December 4-5 H. Leuenberger	Senioren Universität, Basel	Genomics, HTS, Globalization, Megamergers ¿? What next ?¿ Der Beitrag der Pharmatechnologie zum Wettrennen der Pharmagiganten an den Weltmarkt
March 12-15 G. Imanidis	33rd Annual Higuchi Research Seminar, Lake Ozark, MO, USA	Interfacial Phenomena in Electrochemical Drug Transport across Skin
November 29 G. Imanidis	Department of Biopharmacy and Pharmaceutical Technology, Universität des Saarlandes, Saarbrücken, Germany	Systeme zur Untersuchung der oralen Absorption
December 12-16 G. Imanidis H. Leuenberger	US Swiss Nanoforum 2000 with the focus NanoBioSciences, Princeton University, N.J. USA	Properties of Membranes of Nanovesicles and Cells Controlling Drug Transport

H.3.3 Participation in Symposia, Workshops etc.

February 2, Hans Leuenberger	Granulation Workshop, Paris	
March 5-9, M Sutter, F. Rosa and G Imanidis	Poster at the 2nd logP Symposium - Lipophilicity in Drug Disposition, Lausanne, Switzerland	Validation of the Use of Phospholipid Vesicles for Studying the Relationship between Solute Permeability and Microviscosity of Phospholipid Bilayer Membranes
April 25-29, G. Betz, R. Imboden and G. Imanidis	Poster at the 7th International Conference on Perspectives in Percutaneous Penetration, La Grande Motte, France	In Vitro Investigation of Penetration into and Permeation through Human Skin of Heparin from Aqueous and Liposomal Formulations
April 25-29 F.P. Schwarb, E.W. Smith, J.M. Haigh, G. Imanidis and C. Surber	Poster at the 7th International Conference on Perspectives in Percutaneous Penetration, La Grande Motte, France	Influence of the Degree of Saturation of Fluocinonide Solutions on In Vitro Membrane Transport and In Vivo Topical Availability
April 25-29 B. Müller, C. Surber and G. Imanidis	Oral presentation at the 7th International Conference on Perspectives in Percutaneous Penetration, La Grande Motte, France	Correlating the Topical Pharmacological Effect of Nicotinic Acid Derivatives with their Concentration at the Site of Action in the Skin

May 15-18, Hans Leuenberger	Conference of the World's Scientific Academies, Tokyo	Invited as member of the delegation of the Council of Swiss Scientific Academies [CASS]
September 13-15 M. Sutter, V. Miljojkovic, F. Rosa and G. Imanidis	Oral presentation at the Global Pharmaceutical Education Network Meeting GPEN2000, Uppsala, Sweden	Validation of the Phospholipid Vesicle System for Studying Drug Membrane Permeability
September 13-15 G. Imanidis, B. Müller and C. Surber	Oral presentation at the Global Pharmaceutical Education Network Meeting GPEN2000, Uppsala, Sweden	Bioavailability and Concentration/Effect Relationship of Topical Drug Formulations
September 13-15 G. Betz, P. Nowbakht, R. Imboden and G. Imanidis	Poster at the Global Pharmaceutical Education Network Meeting GPEN2000, Uppsala, Sweden	In Vitro Investigation of the Penetration of Heparin into and the Interaction of Liposomes with Human Skin

H.3.4 List of Workshops, Symposia etc organised or co organised by members of the Institute of Pharmaceutical Technology

- Georgios Imanidis:
  PhD-Day of the PhD Candidates of the Centre of Pharmaceutical Sciences University of Basel and Federal Institute of Technology Zürich, October 24, Pharmacentre, University of Basel, Switzerland.
- Hans Leuenberger:
  US Swiss Nanoforum 2000, Princeton University, Princeton N.J., USA, December 13-14, 2000.
  This US Swiss Nanoforum 2000 is a follow-up of the Swiss US Nanoforum 1999 at the ETH Zurich. The focus of the Nanoforum in Princeton was „NanoBioSciences". NASA became interested in this forum and organised in connection with our Nanoforum a workshop on December 12 and December 16.
  The Nanoforum was supported by the Swiss National Science Foundation (Grant No. 4036-064209/1) and by the Swiss Academy of Engineering Sciences [SATW]. Co-organisers from the USA: Prof.M.C.Roco, US National Sciences Foundation; Prof. I.A.Aksay, Princeton University. The Nanoforum received as well a support from US NSF and from Princeton Material Science Laboratory.
- Hans Leuenberger:
  was member of the Scientific organisational Committee of the Council of the Swiss Scientific Academies [CASS], who organised the Symposium „Megatrends: the Rise and Fall of Megatrends in Science", Bern, November 30 December 1, 2000 with the participation of M.C.Roco, US National Science and Technology Council, G.Schatz, President of the Swiss Science and Technology Council, Charles Kleiber, Secretary of State for Science and Technology, Bern; Johannes Randegger, President of the Commission of Science, Education and Culture of the Swiss Parliament, Basel.

H.3.5 List of PhD-Theses in Pharmaceutical Technology completed in 2000

(Supported by)

Frau Chvaicer Claudia

27.1.2000

Solubility and calorimetric behaviour of melatonin in several mixed solvent systems: an approach for nasal application. (Mepha)

Frau Peters Jutta

4.5.2000

Opto-elektronische Inspektionsverfahren für Parenteralia - Vergleich verschiedener Systeme. (Roche)

Frau Dudka Aysel

27.1.2000

CIP (Cleaning in Place) - in der pharmazeutischen Herstellung. (Roche/Glatt)

Herrn Müller Beat G.

19.6.2000

Dosis/Wirkungs-Beziehung von topisch applizierten Nikotinsäurederivaten: Effektive Konzentration am Wirkort und pharmakologischer Effekt in vivo. (Inst.)

Frau Mann Angelika

27.9.2000

High-Temperature Short-Time Sterilisation and its Application to Inline Sterilisation of Disperse Systems. (Novartis)

Herrn Monney Daniel

22.2.2000

Ein Beitrag zur Prozessüberwachung bei der Wirbelschichtgranulierung. (Inst.)

A. Moresi

19.10.2000

Development of an amperogenic Biosensor for Thrombin. (Asulab/Pentapharm/Inselspital)

Frau Raess Rahel

27.9.2000

Untersuchungen zum Einfluss antioxidativer Vitamine (E und C) auf den Stoffwechsel humaner, embryonaler Fibroblasten nach UVA/B Bestrahlung. (Inst.)

Herrn Bürger Carsten

27.9.2000

Zum Druckaufbau während der Pulverkompression. (Inst.)

Frau Marty-Holzgang Simone

11.12.2000

*)Renaissance der Jod-Therapie und Prophylaxe? Beurteilung der Chancen aufgrund einer pharmaziehistorischen Analyse.

Frau Han Qing

22.12.2000

In Vitro Assessment of Small Volume Injectables Based on Pure Organic Solvents. (Novartis)

Frau Betz Gabriele

21.12.2000

Heparin Penetration into and Permeation through Human Skin from Aqueous and Liposomal Formulations In vitro and Interactions of Phospholipids with Skin. (Drossapharm)

*) Reine Fakultätsverantwortung oder Doktorat in der Geschichte der Naturwissenschaften.

I. OUTLOOK

I. 1. On Going Research Activities

I.1.1 PhD-Students, Topics (working title), Supported by

Ahuja	Charu	Untersuchungen zur Iontophoretischen Applikation von Peptiden	Asulab/Bachem/Institut
Altenbach	Melanie	Transdermale Iontophorese von geladenen und ungeladenen Verbindungen: Einfluss der Molekülladung und der Molekülllipophilie auf den Transport durch menschliche Epidermis	Institute of Pharmaceutical Technology, University of Basel.
Bongartz	Christian	Modifying Surface Properties of Crystalline Drug Substances by Addition of Surface Active Substances During the Final Crystallization	Roche
Fueg	Lise-Marie		Skye Pharma AG
Hummel	Daniel	Die Struktur topischer Formulierungen und der Einfluss strukturbedingter physikochemischer Parameter und Evaporation auf –die perkutane Resorption	Spirig AG
Ketani	Damla	Ein Beitrag zur Theorie von hydrophilen Lösungen	Institute of Pharmaceutical Technology, University of Basel.
Krabichler	Michaela	The preventive effect of α-tocopherol on UVA/B-indicated p53-gene photodamage in human skin fibroblasts	Roche
Kuny	Tanja	Untersuchungen zur Trockenagglomeration von pharmazeutischen Wirk- und Hilfsstoffen	Institute of Pharmaceutical Technology, University of Basel.
Lanz	Michael	The behaviour of disordered particulate systems in case of dry and moist agglomeration processes	SNF
Lenz	Corinna	Suche nach kritischen Konzentrationen bei der Herstellung von Pellets in der Rotorwirbelschicht	Spirig AG
N.	N.	The production of Nanocomposites using the spray-freeze-drying technique	Institute of Pharmaceutical Technology, University of Basel.

Opernschall*	Elisabeth	DANN-Vakzine gegen Influenza A Viren	Institut für Medizin.Virologie der Universität Zürich
Sathayé	Bhaskar	Innovative Salbentechnologie	Roche Grenzach
Schiffmann	Axel	CIP-Systeme bei der Wirbelschicht Granulierung	Glatt GmbH
Schmidt	Timo	In vitro Permeabilität von β-Blockern für eine transdermale Applikation	Mepha
Stengele	Andrea	Ein Beitrag zur Charakterisierung von binären, wässrigen Lösungsmittelmischungen mittels Dielektrischer Spektroskopie	Institute of Pharmaceutical Technology, University of Basel.
Sutter	Marc	The Influence of phospholipid Bilayer Properties on Transmembrane Permeabilität	Institute of Pharmaceutical Technology, University of Basel.

*Fakultätsverantwortung.

I.1.2 Diploma Thesises

Exchange Student from Brasil

Bessa	Julia	A contribution to evaluate solubility properties of phenacetin in binary mixtures with the help of dielectric spectroscopy	Private

I.1.3 Topics of Diploma Theses in Pharmaceutical Technology proposed for the year 2001

1. Das Verhalten im elektrischen Feld und die Lösungseigenschaften von binären wässrigen Lösungsmittel-Mischungen
2. Bioverfügbarkeit von Sonnenschutzfiltern in der Haut
3. PharmTechKurs - Feste Arzneiformen
4. PharmTechKurs - Flüssig Sterile Arzneiformen
5. PharmTechKurs - Halbfeste Arzneiformen
6. Slow-release Injectables
7. Liposomen als Modellmembranen
8. Löslichkeit und Auflösungsverhalten von pharmazeutischen Wirkstoffen in wässrigen und organischen Medien
9. Investigation of Chemical Stability of Pharmaceutical Compounds by Microcalorimetry
10. Simultane Iontophorese eines Peptids und eines Markers

11. Gezielte Kristallisation pharmazeutischer Wirkstoffe: Kontrolle von Partikelgrösse, Habitus und polymorpher Form
12. Vergleichende Untersuchungen zur Herstellung und Verarbeitung von „Tasteless Granules“

I. 2. Grants (2000 and 2001)

I.2.1 National Science Foundation

	Grant Number / Title	
2000	2000-058941 The behaviour of disordered particulate systems in case of dry and moist agglomeration processes	30'000.-
2001	2000-058941 The behaviour of disordered particulate systems in case of dry and moist agglomeration processes	30'000.-

I.2.2 Private and Industrial Funds

2000	13 x 30'000.-	390'000.-
2001	8 x 30'000.-	240'000.-

I.2.3 PhD-Studies supported by the University of Basel

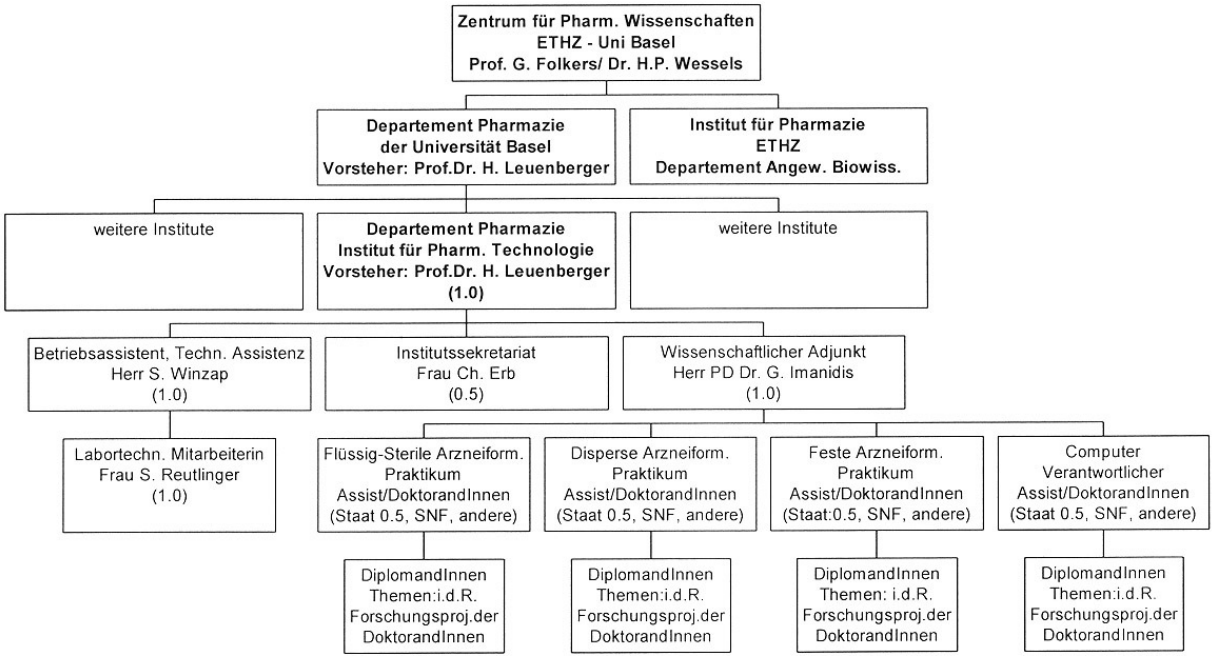
2000	4 x 50% positions à 30'000.-	120'000.-
2001	6 x 50% positions à 30'000.-	180'000.-

I.2.4 Total Support

Year 2000 **CHF** **540'00.-**

Year 2001 **CHF** **450'00.-**

J. ORGANIGRAM



K. PD Dr. D. Giron; Wissenschaftliche Aktivitäten in 2000

K. 1. Activities

K.1.1 Vorträge/Kurse

Mai, ½ Tag	Universität Nancy	Méthodes Thermiques pour la preformulation
April, Mai. Praktikum von 6 Tagen	Universität Basel	Einführung in der Datenbank
August	Plenary Lecture at the ICTAC [International Conference on Thermal Analysis and Calorimetry], Copenhagen	Investigations of Polymorphism and Pseudo-polymorphism in Pharmaceuticals by Combined Thermoanalytical Techniques. Publication accepted for 2001 in J. Thermal and Calor
December 7	CPE Lyon, Formation Permanente	Application de l'analyse Thermique en Pharmacie
September 19	PhandTA 5 [Pharmaceutical and Thermal Analysis], Basel	S.Pfeffer, P.Piechon, C.Goldbronn, L.Viola and D.Giron: The Application of Experimental and Computational Tools to Solve Complex Polymorphism Problems of Pharmaceutical Substances
September 19	PhandTA 5 [Pharmaceutical and Thermal Analysis], Basel, D.	D.Giron, C.Goldbronn, M.Mutz, S.Pfeffer and P.Piechon: Solid State Characterizations of Pharmaceutical Hydrates
September 19	PhandTA 5 [Pharmaceutical and Thermal Analysis], Basel, D.	M.Mutz, F.Zaman and D.Giron, Quantitative Analysis of Crystallinity of Pharmaceutical Powders: Industrial Needs

K.1.2 Poster

September 19-21	PhandTA 5 [Pharmaceutical and Thermal Analysis], Basel, D.	F.Zaman, M.Mutz, P.Schwab, P.Piechon, C.Goldbronn and D.Giron: The Characterization of Pharmaceutical Powders by Solution Calorimetry

K. 2. Publications

- Characterization of pharmaceuticals by thermal analysis. Part 1, *Am.Pharm.Rev.* 2000, **3:**(2), 53-61.
- Characterization of pharmaceuticals by thermal analysis. Part 2, *Am.Pharm.Rev.* 2000, **3:**(3), 43-53.
- Chapter 2 of IUPAC Handbook on Pharmaceutical Salts: Properties, Selection and Use to be published in 2001, D.Giron and D.J.W.Grant „Evaluation of solid-state properties of salts"
- Chapter in Encyclopaedia of Pharmaceutical technology, 2nd ed., to be published in 2001, "Thermal Analysis of Drugs and Drug Products"

K. 3. Nomination

Präsidentin der STK;

[Schweizerische Gesellschaft für Thermoanalytik und Kalorimetrie] ab November 2000.

L. PROF. DR. TH. GÜNTERT; CONTRIBUTION TO THE ANNUAL REPORT OF 2000

In addition to the lectures in Biopharmaceutics, Drug Metabolism and Instrumental Analysis, extensive restructuring took place to achieve a higher degree of coordination within the Pharmacy curriculum.

L. 1. List of Dissertations, Publications, Talks/Posters

L.1.1 Dissertations

Ongoing Dissertations:

- Susan Grange, University Basel, Pharmacokinetic-pharmacodynamic modelling as a tool to extrapolate dose-effect relationships from animal to man. (Beginning 1996)
- Jürg Nyfeler, University Basel, Nitric oxide as a possible marker for vascular endothelial health. (Beginning 1997)
- Stefanie Lerch, University Bern, Ifosfamidtherapie assoziierte Enzephalopathie und ihre Interaktionmit Benzodiazepinrezeptoren (Beginning 2000)
- Olivier Luttringer, University Basel, Physiologically-based Modelling of Active Transport Processes. (Beginning 2000)
- Shiva Neysari, University Basel. Characterization of the functional coupling and binding mode of Neuropeptide-Tyrosine (NPY) Y2 and Y5 receptors: Implications for their functional role (Beginning 2000)

Completed Dissertation:

- Christine Operschall, University Basel, Effect of exogenous VEGF and other potential angiogenic factors (e.g. heparin, mibefradil) on a new rabbit model of chroniccardiac ischemia.

L.1.2 Diploma theses

- Marco Gonçalves, University Basel, In vitro Modell zur Untersuchung der biliären Elimination
- Andrea Tobler, University Basel, In vitro Modell zur Bestimmung der intestinalen Extraktion von Pharmaka

L.1.3 Publications

- S.Grange, N.H.G.Holford, and T.W.Guentert: A pharmacokinetic model to predict the PK interaction of L-dopa and benserazide in rats. Pharm. Res., submitted Nov. 2000.
- O.G.Nilson, K.Aasarød, T.E.Widerøe, and T.W.Guentert: Single and multiple dose pharmacokinetics, kidney tolerability and plasma protein binding of tenoxicam in renally impaired and healthy subjects. Pharmacology and Toxicology, submitted

L.1.4 Invited Speaker

Sept. 19	Symposium of Japanese Health Science Foundation. Tokyo, Japan	Drug Metabolism, Pharmacokinetic and Toxicity Studies in the Risk Assessment of Drug Candidates - Their Role and Importance in the Lead Optimisation Process.
Sept. 20	Dept. of Pharmaceutics, Graduate School of Pharmaceutical Sciences. University of Tokyo.	PK/PD in Drug Development
Sept. 22	DMPK Conference of Association of Pharmaceutical Industries. Hamamatsu City, Japan	Role of DMPK Investigations in Bridging Pre-clinical and Clinical Studies.

L.1.5 External Courses

- Faculty Member in Workshop in Basic Pharmacokinetics, Dept. of Pharmacy, Univ. Manchester. Manchester July 9. - July 14.

L. 2. Research 2000

GUENTERT, Theodor

- In vitro absorption models
- Influence of galenical factors on drug absorption
- Prediction of drug behaviour in humans based on animal and in vitro data
- Simulation techniques
- Pharmacogenomics

M. Publications, Posters and Reports of Dr. K.Iida, Postdoc 1998/99

at the Institute of Pharmaceutical Technology, University of Basel.

Now Faculty of Pharmacy, Meijo University Tempaku, Nagoy, Japan.

M. 1. Publications

- Kotaro Iida, Hans Leuenberger, Lise-Marie Fueg, Rudi Mueller-Walz, and Kazumi Danjo: Effect of Separation Characteristics between Salbutamol Sulfate (SS) Particles and Model Carrier Excipients on Dry Powder for Inhalation. *Journal of the Pharmaceutical Society of Japan* (Japanese), **119:**(10) 752-762 (1999).
- Kotaro Iida, Hans Leuenberger, Lise-Marie Fueg, Rudi Mueller-Walz, Hirokazu Okamoto, Kazumi Danjo: Effect of Mixing of Fine Carrier Particles on Dry Powder Inhalation Property of Salbutamol Sulfate (SS), *Journal of the Pharmaceutical Society of Japan* (Japanese), **120:**(1) 113-119 (2000).

M. 2. Poster Presentations

- Kotaro Iida, Hans Leuenberger, Lise-Marie Fueg, Kazumi Danjo, Hirokazu Okamoto, and Rudi Mueller-Walz: Effect of Adhesion Characteristics between Salbutamol Sulfate and Model Carrier Particles on Dry Powder for Inhalation. Millennial World Congress of Pharmaceutical Sciences, San Francisco, USA, April 16-20, 2000.
- Kotaro Iida, Lise-Marie Fueg, Hans Leuenberger, Rudi Mueller-Walz, Kazumi Danjo, Hirokazu Okamoto: Determination of the Adhesional Property between Salbutamol Sulphate and Carrier Particles in Dry Powder for Inhalation by the Air Jet Sieve Method. FIP 2000 World Congress of Pharmaceutical Sciences, Vienna, Austria, August 26-31, 2000.

M. 3. Reports

- Kotaro Iida: A Report of Pharmacy and University Hospital with the Department of Pharmacy in Switzerland. *Journal of the Japan Pharmaceutical Association*, **51:**(7), 1011-1015 (1999).
- Kotaro Iida: A Report of the Visit to the University Hospital with the Department of Pharmacy in Switzerland. *Japanese Journal of Social Pharmacy*, **18:**(1), 59-62 (1999).
- Kotaro Iida: A Report of the Study Abroad at the Department of Pharmacy University of Basel in Switzerland. *Journal of the Society of Powder Technology*, **37:**(5), 397-402 (2000).
- Kotaro Iida: A Report of the Service of Pharmacist at the University Hospital with the Department of Pharmacy in Switzerland. *Journal of the Japan Pharmaceutical Association*, **52:**(10), 75-79 (2000).

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