

Animal Cell Technology: Products
from Cells, Cells as Products

Animal Cell Technology: Products from Cells₀₀₅₇₉₄₀ Cells as Products

Proceedings of the 16th ESACT Meeting
April 25–29, 1999, Lugano, Switzerland

Edited by

A. Bernard
B. Griffiths
W. Noé
F. Wurm



KLUWER ACADEMIC PUBLISHERS
DORDRECHT / BOSTON / LONDON

A C.I.P. Catalogue record for this book is available from the Library of Congress.

ISBN 0-7923-6075-3

Published by Kluwer Academic Publishers,
P.O. Box 17, 3300 AA Dordrecht, The Netherlands.

Sold and distributed in North, Central and South America
by Kluwer Academic Publishers,
101 Philip Drive, Norwell, MA 02061, U.S.A.

In all other countries, sold and distributed
by Kluwer Academic Publishers,
P.O. Box 322, 3300 AH Dordrecht, The Netherlands.

Printed on acid-free paper

All Rights Reserved

© 1999 Kluwer Academic Publishers

No part of the material protected by this copyright notice may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording or by any information storage and retrieval system, without written permission from the copyright owner.

Printed in the Netherlands.

16th ESACT Meeting Organising Committee

Florian Wurm (Chairman)	EPFL, Lausanne
Alain Bernard (Co-Chairman)	Ares-Serono, Geneva
Maria-Grazia Cali	Serono Symposia, Rome
Hans Eppenberger	ETH-Zurich, Zurich
Ruth Freitag	EPFL, Lausanne
Hansjörg Hauser	GBF, Braunschweig
Caroline MacDonald	University of Paisley, Paisley
Ferruccio Messi	Cell Culture Technologies,
Zurich	
Maurizio Morandi	Chiron, Siena
Wolfgang Noé (Trade Exhibition)	BI Pharma, Biberach
Thomas Ryll	Genentech, San Francisco
Uwe Schlokot	Baxter, Vienna
Georg Schmid (Sponsorship)	Hoffmann-La Roche, Basel
Giuseppe Viscomi	Alfa Wassermann, Bologna

ESACT EXECUTIVE COMMITTEE

Manuel CARRONDO, Chairman
Bryan GRIFFITHS, Treasurer
Florian WURM, Meeting Chairman
Alain BERNARD
Francesc GODIA
Barcelona, Spain
Elisabeth LINDNER-OLSSON
Sweden
Caroline MACDONALD
Otto-Wilhelm MERTEN

IBET, Portugal
Porton Down, UK
EPFL, Switzerland
Ares-Serono, Switzerland
Universitat Autònoma de
Barcelona, Spain
Pharmacia & Upjohn,
Kalamazoo, Michigan, USA
University of Paisley, UK
AFM-Généthon, France

SPONSORS

ESACT and the Organising Committee wish to thank the following companies for their generous support

Akzo Nobel Pharma
Amersham Pharmacia Biotech
Ares Serono SA
B. Braun Biotech International GmbH
Bayer Corporation
Bioengineering AG
BioInvent Production AB
BioWhittaker Inc.
Boehringer Ingelheim Pharma KG
Canberra Packard S.A.
Cansera International Inc.
Cantone Ticino
Crossair-Swissair
E. Merck
Genentech Inc.
Genetics Institute
Genzyme Transgenics Corp.
Hoffmann-La Roche AG
Hyclone Europe S.A.
Immuno AG (Division of Baxter Inc.)
Immunex Corp.
Institut de Recherche Pierre Fabre

Intervet International BV
Inveresk Research International Ltd.
JRH-Biosciences
Life Technologies Ltd.
Lonza Biologics Plc
MA Bioservices
Merck Research Laboratories
MicroSafe BV
Novartis Pharma AG
Novo Nordisk A/S
Nunc A/S
Pall Europe Ltd.
Pasteur Merieux Connaught
PCS Process Control Systems AG
Pharmacia and Upjohn AB
Q-One Biotech Ltd.
Sanofi Recherche
Schärfe System GmbH
Schering AG
Swiss Red Cross - ZLB
SmithKline Beecham Biologicals
Union Bank of Switzerland - UBS

COMPANIES PARTICIPATING IN THE TRADE EXHIBITION

Aber Instruments Ltd.
Amersham Pharmacia Biotech
Applikon BV
Aqasant-Messtechnik AG
Asahi
B. Braun Biotech International GmbH
Bibby Sterilin Ltd.
BioInvent Production AB
BioWhittaker
BioReliance
Boehringer Ingelheim Pharma KG
Paul Bucher Analytik und Biotechnologie
Cansera International Inc.
Cantone Ticino
Cellon Sarl
Cellex Biosciences
Chemunex
Clontech
Connectors Verbindungstechnik AG
Covance Laboratories Ltd.
Digitana SA
Dr. F. Messi Cell Culture Technologies
ECACC CAMR
Genespan Corporation
Genetic Engineering News
Genzyme Transgenics Corp.
Greiner Labortechnik GmbH

Hyclone Europe N.V.
Infors AG
Innovatis GmbH
Integra Biosciences
Inveresk Research
JRH Europe Ltd.
Kendro L.P. GmbH (Sorvall GmbH)
Life Technologies
Lonza Biologics Plc
MAVAG Verfahrenstechnik AG
Microsafe BV
Nature Magazine
New Brunswick Scientific BV
Nunc A/S
Pall Europe Ltd.
Q-One Biotech Ltd.
Quest International
Rutten Engineering
Sarstedt AG
Schärfe System GmbH
Selborne Biologicals
Serologicals Proteins
Sigma-Aldrich Ltd.
Stedim S.A.
Summit Biotechnology
TC Tech Corporation
Terracell
The Automation Partnership
Wave Biotech AG
Winiger AG

LIST OF PARTICIPANTS

Mr. Sushil Abraham
Lonza Biologics
Bath Road 228
Slough, Berkshire SL1 4DY
UK

Prof. Spiros N. Agathos
University of Louvain
Place Croix du Sud 2/19
Louvain-la-Neuve B-3148
Belgium

Mr. François Aguilon
Sanofi Recherches
Labege Innopole Voie n°1 -BP 137
Labege Cedex 31676
France

Prof. Masuo Aizawa
Tokyo Institute of Technology
Dept. Bio Engineering
Nagatsuta, Midori-ku
Yokohama 226-8501
Japan

Dr. Bert Al
CLB
Dept. Biotechnology
Plesman Laan 125
Amsterdam 1066 CX
The Netherlands

Dr. Daniel Allison
ICOS Corporation
22021 - 20th Avenue SE
Bothell, WA 98021-4406
USA

Mrs. Claudia Altamirano Gómez
Universidad Autónoma de Barcelona
Dept. Ingeniería Química
Edifici C
Bellaterra (Barcelona) 08193
Spain

Dr. Massimo Amadori
Istituto Zooprofilattico Sperimentale
Via A. Bianchi, 7
Brescia 25124
Italy

Dr. Hanspeter Amstutz
ZLB Zentrallaboratorium
Blutspendedienst SRK
Wankdorfstrasse 10
Bern 22 3000
Switzerland

Dr. Hideharu Anazawa
Kyowa Hakko co. Ltd.
Asahi-Cho, 3-6-6
Machida, Tokyo 194-8533
Japan

Dr. Dana Andersen
Genentech, Inc.
1 DNA Way
South San Francisco, CA 94080
USA

Mr. Hans Juul Andersen
Statens Serum Institut
5, Artillerivej
Copenhagen 2300
Denmark

Dr. Carlo Andretta
Biospectra AG
Zuercherstrasse 137
Zurich - Schlieren CH-8952
Switzerland

Dr. Clarisse Antoni
Chemunex S.A.
3, Allé de la Seine
Ivry sur Seine Cedex 94854
France

Mrs. Eva Charlotte Appelgren
Meridiano
Via Mentana 2b
Rome 00185
Italy

Dr. Kim Baker
School of Biosciences, University c
Kent
Canterbury, Kent CT2 7NJ
UK

Dr. Achille Arini
Cerbios-Pharma S.A.
Mol.Biol.
Via Pian Scairolo 6
Barbengo 6917
Switzerland

Prof. Matthias Bally
Bioengineering AG
Sagenrainstrasse 7
Wald 8636
Switzerland

Dr. Edward Baetge
Modex Therapeutiques
Rue du Bugnon 27
Lausanne 1005
Switzerland

Mr. Denis Barral
Merial
254 Rue M. Merieux
Lyon 69007
France

Dr. Gianni Baffelli
Nagual Anstalt
Via Carà 9a
Manno 6928
Switzerland

Dr. Michael Bavand
Siegfried CMS, Ltd.
Zofingen 4800
Switzerland

Mr. Charles Bailey
CRC for Biopharmaceutical Research,
UNSW
Dept. Biotechnology, UNSW
Sydney 2052
Australia

Dr. Ulrich Behrendt
Roche Diagnostics GmbH
Nonnenwald 2
Penzberg 82377
Germany

Prof. James E. Bailey
Institute of Biotechnology, ETH
Hönggerberg
ETH Hönggerberg
Zurich 8093
Switzerland

Dr. Roland Beliard
LFB
59 Rue de Trevis
Lille 59011
France

Dr. Alex Baker
Selborne Biological Services Ltd.
Goleigh Farm
Selborne, Alton Hampshire GU34 3SE
UK

Dr. Peter Belt
ID/DLO
Post Box 65
Lelystad 8200 AB
The Netherlands

Dr. Claudia Benati
Molmed S.p.a.
Via Olgettina 58
Milano 20132
Italy

Dr. Walter Beyeler
PCS Process Control System AG
Werkstrasse 8
Wetzikon, ZH CH-8623
Switzerland

Dr. Guy Berg
Covance Laboratories Ltd.
Otley Road
Harrogate, N. Yorkshire HG3 2X4
UK

Dr. Bisson
Lausanne 1011
Switzerland

Dr. Klaus Bergemann
Boehringer Ingelheim Pharma KG
Birkendorferstr 65
Biberach/Riss 88397
Germany

Prof. Henri Blachere
New Brunswick Scientific
Kerkenbos 11-01
Nijmegen 6546 BC
The Netherlands

Dr. Alain Bernard
Serono Pharmaceutical Research
Institute S.A.
14 Chemin des Aulx
Plan-les-Ouates/Geneva 1228
Switzerland

Dr. David Black
Excell Biotech
Pentland Science Park
Penicuik, Edinburgh EH26OPZ
UK

Mrs. Laure Berruex
EPFL
Lab. of Cellular Biotechnology
Lausanne 1015
Switzerland

Dr. Horst Blasey
Serono Pharmaceutical Research
Institute S.A.
14 Chemin de Aulx
Plan-Les-Ouates/Geneva 1228
Switzerland

Dr. Eric Berry
Osmonics
135, Flanders Road
Westborough, MA 01581-6046
USA

Mr. Carel F. Bode
Bodenco B.V.
Otterkoog 7
Alkmaar 1822 BW
Holland

Dr. Wolfgang Berthold
Hoffmann-La Roche Inc.
340 Kingsland St.
Nutley, NJ 07110
USA

Dr. Berthold Boedecker
Bayer AG
Abteilung PH-TO/ELB, Biotechnologie
Gebäude 46
Friedrich Erbert Strasse 217
Wuppertal 42096
Germany

Dr. Jan Boesen
IntroGene BV
P.O. Box 2048
Leiden 2301CA
The Netherlands

Prof. Claudio Bordignon
Istituto Scientifico H.S. Raffaele
Via Olgettina 60
Milano 20132
Italy

Mr. Maximilian Boldt
Innovatis GmbH
Hauptstrasse 72
Berlin 12159
Germany

Dr. Octaaf Bos
ID-DLO
P.O. Box 65
Lelystad 8200 AB
The Netherlands

Dr. Bryan Bolton
ECACC
Porton Down
Salisbury, Wiltshire SP4 0JD
UK

Mrs. Michaela Bourgeois
EPFL
Lab. of Cellular Biotechnology
Lausanne 1015
Switzerland

Dr. Michele Bomio
SAM AG
Albulastrasse 57
Zurich 8048
Switzerland

Mr. Leo Bowski
Hoffmann-La Roche, Inc.
340, Kingsland Street
Nutley, NJ 07110
USA

Dr. Hendrik Bonarius
Novo Nordisk A/S
Hagedornsvej 1
Gentofte 2820
Denmark

Mrs. Johanna Brändli
Hochschule Wädenswil
Grüntal
Wädenswil 8820
Switzerland

Mr Marco Boorsma
Cytos Biotechnology AG
Einsteinstrasse 1-5 Postfach 150
Zurich CH-8093
Switzerland

Dr. Ruud Brands
Solvay Pharmaceuticals
P.O. Box 900
Weesp 1380
The Netherlands

Miss Maryline Bordes
Virbac
Bio 4 ZI Carros
Carros Cedex 06511
France

Mr. Malcolm Brattle
Q-One Biotech Ltd
West of Scotland Science Park
Glasgow G20 0XA
UK

Dr. Henner Brett-Schneider
Bio West
Rue de la Caille
Nusille 49340
France

Dr. Christa Burger
Merck KGaA
Frankfurter Str.250
Darmstadt 64271
Germany

Dr. Herve Broly
Soregio
Bordeaux Technopolis
Martillac 33650
France

Mr. Gerry Burgers
New Brunswick Scientific
Kerkenbos 11-01
Nijmegen 6546
The Netherlands

Dr. Peter Brown
Biotechnology Solutions
20 Woodcrest Drive
Orinda, CA 94563
USA

Prof. Michael Butler
University of Manitoba
Dept. Microbiology
118 Buller Bldg.
Winnipeg, Manitoba R3T2N2
Canada

Dr. Paul Bucher
Paul Bucher Comp
Schutzengraben 7
Basel 4051
Switzerland

Mrs Marie Ange Buyse
Innogenetics N.V.
Industriepark
Ghent 9052
Belgium

Mr. William Bucher
Lampire Biological Laboratories, Inc.
P.O. Box 270
Pipersville 18947
USA

Dr. Paolo Caccia
Pharmacia Up John
Viale Pasteur 10
Nemiano 20014
Italy

Dr. Greg Buckley
TC Tech Corporation
7600 W. 27th st. Unit 202
Minneapolis, MN 55426
USA

Dr. Cinzia Cagnoli
ETH
Universitätstr. 16
Zurich 8092
Switzerland

Prof. Heino Büntemeyer
Lehrstuhl Zellkulturtechnik, University
Bielefeld
PO BOX 100131
Bielefeld 33501
Germany

Mrs. Maria Grazia Cali
Serono Symposia
Via Casilina 125
Rome 00176
Italy

xxx

Mr. Eric Calvosa
Merial
254 Rue M. Merieux
Lyon 69007
France

Mr. Gian Luca Casella
Economic Promotion Ticino
Viale St.Francini 17
Bellinzona 6500
Switzerland

Dr. Joseph Camire
Hycloné Europe NV - Belgium
Friedenstrasse 34
Asiar 35614
Germany

Mr. Adolfo José Castillo Vitlloch
Centre of Molecular Immunology
Calle 216 y 15, Atabey, Playa
Havana 11600
Cuba

Dr. Manuel Carrondo
IBET
Apartado 12
Oeiras 2780
Portugal

Dr. Aziz Cayli
Roche Diagnostics GmbH
Nonnenwald 2
Penzberg 82377
Germany

Mr. Gerald Carson
BASF Bioresearch Corporation
100 Research Drive
Worcester, MA 01605
USA

Ms. Anna Cellesi
Chiron Vaccines
Via Fiorentina, 1
Siena 53100
Italy

Miss Ana Verónica Carvalhal
IBET / ITQB
Apartado 12, 4º piso
Oeiras 2780
Portugal

Ms. Roberta Cenci
Seron Symposiums
Convention Bureau
Via Casilina 125 - 00176
Rome 00100
Italy

Dr. John Carvell
ABER Instruments Ltd.
5 Science Park
Aberystwyth SY23 3AH
UK

Dr. Helen E. Chadd
Abgenix Inc.
7601 Dumbarton Circle
Fremont, CA 94555
USA

Mr. Antoni Casablanas
Universitat Autònoma de Barcelona
Dept. Enginyeria Química
Edifici C
Bellaterra (Barcelona) 08193
Spain

Mr. Michael Chaffee
Lonza Biologics
225, Bath Road
Slough, Berkshire SL1 4DY
UK

Mr. Patrick Chang
BioWhittaker Inc.
8830 Biggs Ford Road
Walkerville, MD 21793
USA

Miss Susan Chapple
Oxford Brookes University
BMS Gipsy Lane Campus
Oxford OX3OBP
UK

Miss Nathalie Chatzisavido
Pharmacia and Upjohn
Linhagensgatan 133
Stockholm 11287
Sweden

Dr. Jean-Francoise Chaubard
Rhône -Poulenc
13, Quai Jules Guesde BP 14
Vitry sur Seine Cedex 94403
France

Dr. Li-How Chen
Genzyme Transgenics Corporation
5 Mountain Road
Framingham, MA 01701-9322
USA

Mr. Stéphane Chenu
CNRS Nancy
2, Av. Forêt de Haye
Vandoeuvre-Les-Nancy 54505
France

Dr. Laurent Chevalet
Centre d'Immunologie Pierre Fabre
5 Avenue Napoleon III
Saint-Julien en Genevois Cedex 74164
France

Mr. Ernesto Chico
Center of Molecular Immunology
(CIM)
P.O.Box 16040
Havana 11600
Cuba

Dr. Myung-Sam Cho
Bayer Corporation
800 Dwight Way
Berkeley, CA 94701-1986
USA

Dr. Veronique Chotteau
Pharmacia Upjohn
Strandbergsgatan 47
Stockholm 11287
Sweden

Dr. Yi-Ding Chu
Development Center for Biotechnology
81, Chang-Hsing st.
Taipei 105
Taiwan, R.O.C.

Prof. Klaus Cichutek
Paul-Ehrlich-Institute
Medical Biotechnology
Paul Erlich Str. 51
Langen 63225
Germany

Mr. Martin Clarkson
Vericore Ltd
4, Warner Drive, Springwood Ind.
Estate
Braintree Essex CM7 24W
UK

Dr. Timothy Clayton
Glaxo Wellcome R & D
Biotechnology Development
Laboratories
South Eden Park Road
Beckenham, Kent B233B5
UK

Mr. Efi Cohen-Arazi
Ares Serono
Av. Perrausaz, 131
La Tour de Peirz 1814
Switzerland

Prof. Mark Cunningham
Ares Advanced Technology Inc.
280 Pond Street
Randolph, MA 02368
USA

Mr. David Connolly
National Diagnostic Centre
N.U.I. Galway
Galway
Ireland

Mr. Marcello Cusinato
B. Braun Biotech International
Schwarzenberger Weg 73-79
Melsungen 34212
Germany

Prof. Harald S. Conradt
GBF - Braunschweig
Dept. Protein Glycosylation
Mascheroder Weg 1
Braunschweig D-38124
Germany

Mr. Samuel Cymbalista
Rue Dr. Yersin, 9
Morges 1110
Switzerland

Dr. Coppolecchia
Cerbios-Pharma S.A.
Mol. Biol.
Via Pian Scairolo, 6
Barbengo 6917
Switzerland

Mr. Martin Daescher
Zürcher Hochschule Winterthur Z
Postfach 805/ Chemie
Winterthur 8401
Switzerland

Dr. Angel Cruz
Schering Plough Research Institute
1011 Morris Ave (u-1-2 2200)
Union, NJ 07083
USA

Dr. Jo Dalle
Pharming N.V.
Cipalstraat 3
Geel 2440
Belgium

Mr. Helder Cruz
IBET
Apartado 12
Oeiras P-2780
Portugal

Mr. Daniel Dätwyler
Institut für Zellbiologie ETH Zuri
HPM F27 ETH Hönggerberg
Zurich 8093
Switzerland

Dr. Pedro Cruz
IBET
Apartado 12
Oeiras P-2780
Portugal

Dr. Bruno De Bortoli
BioWhittaker Europe
Parc Industriel de Petit Rechain
Verviers 4800
Belgium

Dr. Maria De Jesus
EPFL
Lab. of Cellular Biotechnology
Lausanne 1015
Switzerland

Dr. Jonathan Dempsey
Cambridge Antibody Technology
The Science Park
Melbourn, Cambs. SG8 6SS
UK

Dr. Michele De Luca
I.D.I. Ist. Dermatologico dell'Immacolata
Via dei Castelli Romani 83/85
Rome 00040
Italy

Mr Mohamed Desai
Medeva Pharma
Gaskil Road
Speke, Liverpool L24 9GR
UK

Dr. Robert De Paulis
BIOPTIM
12, Rue de la Salle
Saint Germain en Laye 78100
France

Mohamed Desay
Medeva Pharma
Gaskil Road - Speke
Liverpool L24 9GR
UK

Mr. Frank Deer
Ares Advanced Technology
27, Pacella Park Drive
Randolph, MA 02368
USA

Dr. Emmanuel Desmèzières
Institut Pasteur
25-28 rue du Dr. Roux
Paris Cedex 15 75724
France

Dr. Nicole Deglon
Division of Surg. Research Gene
Therapy Center
Pavillon 4
Lausanne 1011
Switzerland

Dr. Kathleen Devos
N.V. Innogenetics
Industriepark 7 Box 4
Zwijnaarde (Ghent) B-9052
Belgium

Mr. Yves Dehon
Smithkline Beecham
89 Rue de l'Institute
Rixensart B- 1330
Belgium

Miss Janique Dewelle
Laboratoire Biochimie et Biologie
Cell., FUNDP
Rue de Bruxelles 61
Namur 5000
Belgium

Dr. Jean Delobel
Merial
254 rue Marcel Merieux
Lyon
France

Mr. Jean Didelez
Smithkline Beecham Biologicals
Rue de l'Institut 89
Rixensart 1330
Belgium

Mr. Fritz Diener
Rütten Engineering
Industriestrasse 9
Stäfa 8712
Switzerland

Mr. Paul Ducommon
EPFL
Lausanne 1015
Switzerland

Dr. Paul Dierickx
Institute of Public Health
Wytsmanstraat 14
Brussels B-1050
Belgium

Mr. Ulrich Dudel
Astra Biotech Laboratory
Byggnad 329
Södertälje S-151 85
Sweden

Mr. Othmar J. Dill
BLC
Biology
Ernst-Handschuh-Str.3A
Worms 67549
Germany

Mrs. Petra Eberhardt
Boehringer Ingelheim Pharma KG
Birkendorfer Str.65
Biberach/ Riss 88397
Germany

Dr. André Dinter
University of Zurich, Institute of
Physiology
Winterthurerstr.190
Zurich 8057
Switzerland

Mrs. Joke Ederveen
MicroSafe B.V.
Niels Bohrweg 11-13
Leiden 2333 CA
The Netherlands

Mr. Uwe Ditzen
Kendro Laboratory GmbH
Heraeusstrasse 12-14
Hanau 63450
Germany

Ms Jacqueline Edwards
The Automation Partnership Ltd.
Melbourn Science Park
Royston, Herts SG8 6HB
UK

Mrs. Jana Dolnikova
Biogen Inc.
14, Cambridge Center
Cambridge, MA 02142
USA

Prof. Regine Eibl
Hochschule Wädenswil
Grüntal
Wädenswil 8820
Switzerland

Dr. Charles Dowding
Systemix
3155 Porter Drive
Palo Alto, CA 94304
USA

Mr. Edgar Elsner
Innovatis GmbH
Hauptstrasse 72
Berlin 12159
Germany