# biotech-info

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OMIKK AGROINFORM

# BIOTECH-INFO

**Special issue**
**1989**

The publication contains abstracts and annotations of selected works published by Hungarian authors in the technical literature on biotechnology in Hungary

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# BIOTECH-INFO

Special issue

# BIOTECHNOLOGICAL PUBLICATIONS OF HUNGARIAN AUTHORS in 1989

edited by:
Mr László Kállai

Budapest, 1990

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Hungary is a small country and the aim of the National Technical Information Centre and Library (OMIKK) is to provide information services for Hungarian scientists, engineers and managers thus enabling the expansion of the national economy as well as, the development of the society. However, OMIKK and its international sales branch OMIKK-Technoinform

**has an ample choice of services it can offer for the other countries of the world.**


continued on p.14.

# P R E F A C E

The fundamental objective of the journal Biotech-Info is to provide Hungarian readers with Hungarian language abstracts, digests and reviews of original publications of foreign authors. The journal is published monthly, that is 12 issues appear in a year.

The present issue is the 13th one of the journal, and its goal is just the opposite of the other 12 issues: our intention is to inform our foreign colleagues about biotechnological publications of Hungarian authors. For this end in view, the special issue is published in English.

We have tried to do our best in collecting a representative summary of the works of Hungarian authors. Nevertheless, we must recognize that, despite of all our effort, this issue is not as complete as we have wanted it to be. Several authors had not submitted the requested publication or manuscript. We ask for our Readers' indulgence for the missing information, and at the same time we apologize to the authors who would recognize later that their work was not included in that special issue.

Another reason we might be criticized for is that, contrary to the special issues published in 1988 and 1989, this issue contains abstracts of original publications only, scientific publications meant for the general public as well as review articles are excluded. We felt these materials are meant chiefly for the Hungarian rather than foreign readers. An other aspect of selection was that we had the intention to restrict the scope of this issue to the field of new biotechnology. Papers submitted by Hungarian authors was selected accordingly, while we had never denied that research reports and publications on scientific fields other than biotechnology are equally valuable. But our task is to disseminate information on biotechnology!

Budapest, April, 1990

Prof. Dr. László Kállai
Editor-in-chief

# ELŐSZÓ

A BIOTECH-INFO alapvető célja és feladata, hogy külföldi szerzők eredeti közleményeinek összefoglalását, a közleményekből készített tömörítéseket vagy szemleanyagokat (review) tegyen közzé *magyarul, a magyar nyelven olvasók* számára. A folyóirat havonta egyszer, azaz évente 12 alkalommal jelenik meg.

Ez itt most a BIOTECH-INFO 12+1, azaz 13. száma, amelynek célja az előző 12 számnak éppen a fordítottja: *a külföldi kollégák tájékoztatása a magyar szerzők biotechnológiai tárgyú munkáiról, angolul.* Vagyis ez a "special issue".

Igyekeztünk hiánytalanul összegyűjteni a magyar szerzők munkáinak összefoglalóit, de nem végezhettünk teljes munkát, mivel egyes szerzők többszöri felkérésünkre sem küldték el publikációjukat, postereik szövegét, elhangzott előadásaik kéziratát. *A hiányokért elnézést kérünk* olvasóinktól, s egyben azoktól a magyar szerzőktől is, akik majd a különszám megjelenése után szemrehányást tesznek nekünk azért, hogy munkájukat miért nem válogattuk be.

Talán még azért is érhet bírálat bennünket, hogy az 1987-es válogatással ellentétben, *csakis az eredeti* közlemények összefoglalóját tesszük közzé, a népszerűsítő vagy szemlecikk jellegű publikációkat nem ismertettük,mivel ezek az anyagok - véleményünk szerint - elsősorban a magyar olvasóknak készültek. Még egy további szelekciós szempontunk is volt, ti. hogy a biotechnológia fogalmát a szűkebb értelemben vett *új biotechnológia területére korlátoztuk.* Ennek megfelelően szelektáltuk a magyar szerzők által beküldött anyagokat, elismerve, hogy a más tudományágak területére eső kutatási jelentések, közlemények éppen olyan érdekesek lehettek volna, mint a biotechnológiai publikációk. A mi dolgunk azonban csak a biotechnológia propagálása.

**Prof. Dr. Kállai László**

**főszerkesztő**

# CONTENTS


ORSZÁGOS MŰSZAKI INFORMÁCIÓS KÖZPONT ÉS KÖNYVTÁR
ГОСУДАРСТВЕННЫЙ ИНФОРМАЦИОННЫЙ ЦЕНТР И БИБЛИОТЕКА ПО ТЕХНИКЕ
NATIONAL TECHNICAL INFORMATION CENTRE AND LIBRARY
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Its information services range from processing, publishing and disseminating scientific and technical information to offering online access to various foreign databases.
The activities of OMIKK are controlled by the State Office for Technical Development (Országos Műszaki Fejlesztési Bizottság, OMFB) expressing that information work in Hungary is regarded as integral part of technical development.
About 500 full-time employees, supported by some 2500 outdoor collaborators (engineers, scientists, economists) perform the work of the institution and provide for high-level services offered to the users and customers.

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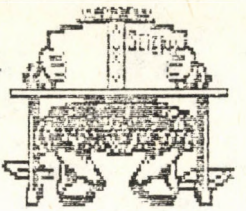
# PUBLICATIONS OF THE NATIONAL TECHNICAL INFORMATION CENTRE AND LIBRARY (OMIKK)

OMIKK and AGROINFORM (Information Centre of the Ministry of Agriculture and Food), sponsored by the Protein and Biotechnology Division of the State Office for Technical Development (OMFB) publish three types of publication on biotechnology:

**BIOTECH-INFO:** a monthly periodical journal on biotechnology. It contains abstracts from 400 special journals in the field of life sciences and relative areas, and one or more review articles in each number. There is a special issue every year, this 13th number contains abstracts of the articles written by Hungarian authors in Hungarian and foreign technical journals related with biotechnology.

**FOLIA BIOTECHNOLOGICA:** series of monographs, written by Hungarian specialists of the given area. There are about 6 issues in a year.

**BIOTECHNOLOGY TODAY:** these publications are studies, reviews of general interest on biotechnology as well as on materials of different seminars, conferences and symposiums. There are about 6 issues in a year. The Hungarian title: Napjaink Biotechnológiája.



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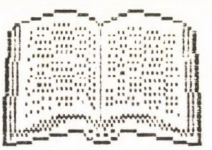

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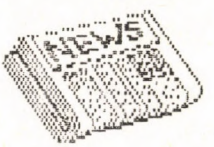


**but You sure keep some for**

*Cereal Research Communications*

Published by the
CEREAL RESEARCH INSTITUTE
6701 Szeged, POB.391.,Hungary

FOLIA BIOTECHNOLOGICA

FOLIA BIOTECHNOLOGICA No. 29 1989

# EMBRYO FREEZING

author: S. CSEH

In 1950, SMITH and POLGE discovered the protective action of glycerol on the spermatozoa of several species during freezing and thawing. This result is considered as tne beginning of the cryobiology by many scientists. The freezing of bull spermatozoa became a routine method in the every day work of cattle breeding. Since then many other cells and tissues have been frozen succesfully to very low temperature.

The cryobiology is recognized as a scientific discipline investigating the biological process in the cells during the freezing and at very low temperatures.

In 1972 two research groups /WILMUT and WHITTINGHAM, LEIBO and MAZUR/ showed that mouse embryos can survive freezing to temperature as low as $-269^{\circ}C$ /liquid helium/. Similarly to the sperm freezing, the embryo storage technique is also very important, not only in the research work, but in the practical life of the agriculture and human medicine, too.

This study presents:

- the importance of the embryo freezing,
- the fundamental principles of cryobiology,
- the different freezing technologies,
- the classification of the embryos before the freezing and after the thawing,
- the latest results of research.

FOLIA BIOTECHNOLOGICA No. 30 1989

## LIST OF HUNGARIAN BIOTECHNOLOGISTS - EXPERTS IN BIOTECHNOLOGY

Editor: L. Kállai

The list of Hungarian biotechnologists was published for the first time in the 3rd number of the Folia Biotechnologica in 1985. There has been many changes since then. The current list contains all co-workers being in relation to biotechnology at firms, research and information institutions, societies today.

The list is composed of four parts: the first part lists biotechnologists in the alphabetical order of the organizations they are affiliated to, indicating places, postal address and phone number of organizations. In the second part names of experts are listed in alphabetical order. The third and fourth parts contain the list of Hungarian biotechnological institutions and companies in Hungarian-English and English-Hungarian languages.

FOLIA BIOTECHNOLOGICA No 31 1989

## PLASMID STABILITY OF RECOMBINANT DNS STRAINS

authors: A. Ballagi-Pordány, T. Illeni, B. Sevella, Gy. Rajkai, L. Nyeste

Modern biotechnology industry based on the mass production of genetically mainpulated cells of microorganisms uses the same well proved culture techniques and bioreactors as the classical fermentation industry. However, fermenting these strains one must take into consideration that the physiology of manipulated cells is different from that of the wild type cells', and that the preparation of plasmid coded product means a metabolic burden for the cells. Thus they are in a so-called selective disadvantage to the cells which do not carry a plasmid /or more exactly a new genetic characteristic/.

This publication deals with the problems of plasmid stability caused by structural and segregational instability, and the factors influencing plasmid stability, it investigates the cultural methods ensuring plasmid stability. It makes a detailed study of the mathematical models meeting requirements of plasmid stability during the culture of plasmid-carrying microorganisms.

FOLIA BIOTECHNOLOGICA No. 32 1989

## GENETIC MODIFICATION OF MYCOBACTERIUMS IN ORDER TO PREPARE STEROID PHARMACEUTICALS

author: Antalné Jekkel

From quick-growing mycobacteriums utilizing sterine after preculture in the presence of vancomycin antibiotic and glycin, spheroplasts can be prepared with lysosime enzyme. Our experiments demonstrate that the spheroplast mutation and the in vivo recombination carried out by spheroplast fusion is a convenient method for preparation of strains with changed ability of sterine-degradation. The in vitro recombination method under development can serve as a more effective means in improving those characteristics of mycobacteriums, which are valuable from the industrial point of view.

FOLIA BIOTECHNOLOGICA No. 33 1989

## FATTENING OF BOAR PIGLET AND THE BOAR SMELL

authors: K. Ender, M. Lieberenz, O. Siegl, M. Steinberg

This study summarizes the results of 239 experiments carried out in the GDR and abroad, during the last decade, dealing with the possibility of fattening of boar piglets and the problems of the boar smell. The androgene and oestrogene hormones increase the fattening capacity of boar piglets by 10% but at the same time their body has an unpleasant genital smell. There is a great necessity of research for the utilization of economical advantages obtainable by boar fattening.

FOLIA BIOTECHNOLOGICA No. 34 1989

BIOREACTOR ARRANGEMENTS IN WASTEWATER CLEANING

authors: Andrea Jobbágy, L. Nyeste

During the biological cleaning of wastewater - in most cases - the removal of a great number of components with different properties is carried out by a heterogenous microflora. So the conditions provided for the biodegradation have a selecting effect on the most corresponding microorganisms and processes. This study is dealing with the theoretical basis of the relation between the quality of wastewater and the effectivity of cleaning. All the practical solutions are treated from this point of view.

FOLIA BIOTECHNOLOGICA No. 35 1989

MOLECULAR BIOLOGY OF AIDS

author: F. Fehér

A terrible syndrome, the acquired immune deficiency, an extraordinary scientific challenge: triumpf over the AIDS, and the promise of a great business: the diagnostics of AIDS /now/ and the therapy of AIDS /in the future/, all of them are together in this topic and biotechnology cannot be left out, either. This new piece of the AIDS-literature reveals the molecular biology of AIDS from the point of view of biotechnology, dealing with the problems of the virus activity, diagnostics and the possible therapy of this illness.

FOLIA BIOTECHNOLOGICA No. 36 1989

BIOTECHNOLOGY AND MILK PRODUCTION - ON THE WAY BETWEEN THE TRADITION AND THE FUTURE

author: prof. dr. H. Foissy

This publication shows the results of application of biotechnological methods in dairy industry. Discusses their health and economical aspects, taking into consideration the consumers' demand, too. It pays attention to the possibility of application of biotechnology in the cheese production.

FOLIA BIOTECHNOLOGICA No. 37 1989

DISINTEGRATION OF MICROBIAL CELLS

authors: M. Pécs, L. Nyeste

This publication deals with the laboratory or industrial scale disintegration methods of microbial cells produced by fermentation, it presents the necessary knowledge about the cell wall structure for developing of more efficient processes and the most important analytical methods as well.

# Editing, publishing and distribution of documents

Hungarian *books, journals and other publications in foreign languages* (including conference proceedings) not available through the regular booktrade are sold abroad by OMIKK-Technoinform. We try to keep you informed about the titles of available publications. Nevertheless, please, do not hesitate to contact us, should you need additional information on publications for sale, or even about on a specific publication being of interest to you.

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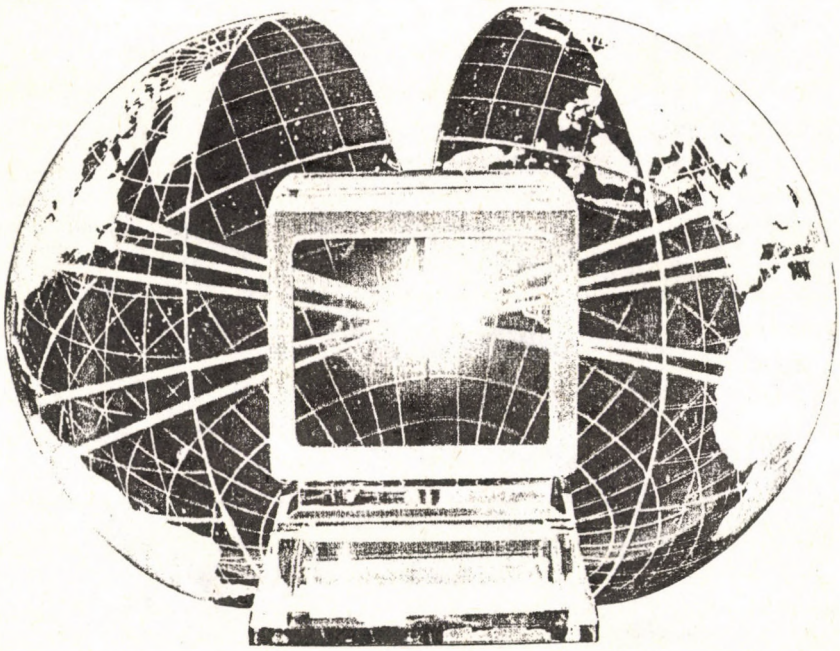


continued on p.64.

# BIOTECHNOLOGY TODAY

NAPJAINK BIOTECHNOLÓGIÁJA No. 20 1989

From biotechnique to biotechnology, Conference, Szeged, 6-8 of June, 1988 /in English/

CONTENTS

E. Kiss, G. Gyulai, Zs. Horváth, F. Csillag, L.E. Heszky: Somatic embryogenesis from cotyledons of immature soybean embryos

G.N. Raldugina, R.G. Butenko: Plant regeneration in protoplast culture from Brassica napus hyppocotyls

R.S. Pundeva, N.A. Zagorska: Included callusogenesis and embryogenesis in capsicum anther cultures

S.C. Vuteva, N.A. Zagorska: Androgenesis - including factors in Datura innoxia mill

L. Szilágyi, K. Győző: In vitro tissue cultures from the Hungarian populations of Scilla bifolia aggregate

K. Selonen, P.M.A. Tigerstedt: The use of interspecific crosses in Rubus breeding

A. Breznovits, A.Major,, E. Sheffield, G. Vida: Electrofusion of fern protoplasts by Alfa-200 fusion generator

M. László, M. Fári: Using of different products for substitution of agar in the plant micropropagation in vegbox plastic container

M. Kelemen, E. Masek, T. Perényi, F. Sólyom, E. Szegletes, G. Szabó, B. Köves, Zs. Ujfalusi: Production of inactived vaccine against Aujeszky's disease with microcarrier cell culture method

M. Tóth, A. Mai, E. Duda: Recombinant tumor necrosis factor: production, purification and biological properties

F. Majhen: High quality, accurate pipettors, used at microbiology, biochemistry, industrial laboratories, in hospitals, pathology, in schools, universities, for experimentations, etc.

L. Solti, J. Seregi, F. Szász: Biotechnology under large-scale farm conditions

K. Schellander, J. Führer, C. Hassan-Hauser, W. Schleger: Long time culture of mouse and cattle embryos

S. Cseh: The experiences of the freezing of cattle and sheep embryos at the embryotransfer

Á. Farkas, E. Gyökér-Galgóczyné, E. Gergátz: Later experiences at sheep embryo manipulation.

Á. Kovács, B. Bényei, S. Cseh, L. Csillag, N. Kroó, F. Szász: Studies on embryo splitting by laser

J. Bálint, B. Csillik, E. Knyihár; A sertés kansperma finomszerkezeti változásai a tárolás során

E. Gergátz, E. Galgóczy, Á. Farkas: Coculture of early ovine embryos

J. Wagner: Membrane filtration and down-stream processing - an indispensable combination

Cs. Sisak, B. Szajáni, L. Boross: Resolution of racemic amino acids by immobilized aminoacylase in fluidized bed reactor

L. Gubicza, A Ujhidy, J. Bodnár, L. Markói: Enzyme catalyzed esterification of organic solvents

Gy. Árvai, A. Fekete, I. Patócs: Study of cellulose degrading preparation on winter wheat straw

L.M. Simon, N. Kotormán, M. Ábrahám, B. Szajáni: Application of immobilized enzymes for analytical purposes

K. Juhász-Czulek, Á. Hoschke: Characterization of immobilized glucoamylases from industrial aspects

Á. Hoschke, E. Nagy, K. Bélafi-Bakó, A. Ujhidy: Maltodextrin hydrolysis by glucoamilase

J. Temesvári, Á. Hoschke: Preparation of amylase-free industrial glucose oxidase for analytical purposes

T.T. Davidenko, A.V. Chuenko, B.V. Sevastyanova: Immobilization of lytic enzymes and their application for treatment of the purulent wounds

I. Hosszu, M. Tóth: Improved technology of wort production by application of brewing enzymes

Y.R. Thorstenson, B.C. Martin: Stable carbon isotope ratics for selection of water-use efficient tomato cultivars

V.V. Gulij, P.L. Talpalatsky: Insecticide biopreparation production on the basis of insect mass multiplication

M. Kamionek, A Bednarek: Use of the entomophilious nematodes in the biological control of the forest pest Acantolyda nemoralis

I. Pacs, F. Puskás, Zs. Halász: Prefermentation - a way to effective decomposition of organic materials by earthworms

E. Simon: Streptomyces griseviridis - new possibility for the control of soil-borne pathogenes

E. Aubrecht: A buza fehérjetartalmának meghatározása immun-analitikai módszerrel

K. Andrasek, S. Kemény: Effect of growth regulators on wheat yield components and on proteins of wheat seeds

O. Juhász, P. Kozma, L. Lelik: Composition of sugars, organic acids and amino acids in musts of Vitis vinifera varieties

E. Gábor, H. Sárosi, A.S. Polák, K.H. Almásy: Texturized blood protein for human nutrition

K. Köves-Péchy, É. Bakondi-Zámory, J. Szegi, T. Szili Kovács: Rhizobium inoculation as an environmental protective process

J. Szegi, F. Gulyás, É. Bakodi-Zámory, T. Soós: Effect of rhizobium inoculant on seed yield of soybean, pea and horse-bean in field trials

A. Photo-Landenpera: The development of Streptomyces griseoviridis-isolate to a commercial preparation - Mycostop

M.L. Lahdenpera: Mycostop - a biopreparation for fungal plant disease control

T. Manole: Basic problems of insect pathology in southern Roumania

A. Szitó: Mass culture of Chironomous riparius meigen /Chironomidae/ on different manures

A. Pálos, Á. Klein: Computer based information services in biotechnological research

S. Sorvári: Starch medium and osmosis in barley anther culture

P.C. Boyadjiev: A comparative test of rice diploid lines obtained through anther culture methods

Round-Table Conversation about the state and perspective at the science parques?

☆

NAPJAINK BIOTECHNOLÓGIÁJA No. 21 1989

The state and development tendencies of biotechnology in food industry, possibilities of development in Hungary /in Hungarian/ Editors: L. Z. Lengyel, K. Kóbor

This study deals with the international trends and the tasks of the Hungarian biotechnology industry on the field of food production

☆

NAPJAINK BIOTECHNOLÓGIÁJA No. 22 1989

Symposium of experts of GDR and Hungary on the co-operation in biotechnology, Berlin, 19-23 of September, 1988 /in Germany/ Editor: Dr. F. Márffy

Inzaltsverzeichnis

Einsatz der SUMAL-Gerätsystems in der medizinischen Diagnostik Janchen, M.., G. Schmidt, B. Neef

Einsatz von Laborfermentoren in der Biotechnologie, H.-P. Schmauder

Instrumente für die Biotechnologie, P. Fábry

Gewinnung von Enzymen und HVL-Hormonen zum Einsatz in Diagnostika für die Humanmedizin, B. Schwenzer, M. Werner, St. Glawion

Gewinnung monoklonaler Antikörper zur Blutgruppenserologie, Musielski,H.

Differenzierung humaner Leukozyten mittels Monoklonaler Antikörper
Fiebig, H.

Verwendung von monoklonaren Antikörpen im Gesundheitzschutz
Dr. E. Vasanits-Varga

Anwendung von biotechnologischen Methoden in der Weizenzüchtung,
Sági, F.

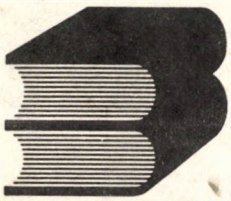
Pflanzliche Zell- und Gewebekulturen in der biotechnologischen Forschung, H.-P. Schmauder, B. Wichetek

IMET-Nationale Sammlung von Mikroorganismen, H. Prauser

Über die Aktivität der nationalen Sammlung von Landwirtshcaftlichen und industriellen Mikroorganismen, T. Deák, F. Márffy

Embryonenmanipulation in der Tierzucht, E. Gergátz

Tilgung Infektiöser Tierkrankheiten mittels Embryonentransplantation
J. Seregi und J. Péli



# EDUCATION

## BIOTECHNOLOGY ON VIDEO

The National Committee for Technical Development /OMFB/ made different video films on biotechnological subjects for informatical, educational, documentary and popularizing purposes. The materials are produced and brought in by the video studio of Educational Technology Department of 'L. Eötvös' University and some of them by the EDUSYSTEM GMK. The video programmes are available for anyone interested in them either for copying or for buying.

You can choose from the following programmes:

- OMFB and Biotechnology 1987 /31 min/

2-3 minute introducing sequences in Hungarian and/or in English on the research work carried out by 11 research institutes and firms.

- OMFB and Biotechnology 1988 /29 min/

2-3 minute introducing sequences in Hungarian and/or in English on the research work carried out by 10 research institutes and firms.

- OMFB and Biotechnology 1989 /30 min. in preparation/

Showing some of the basic biotechnological research works in Hungary, and an introductive exposition about the new research institute: Agricultural Biotechnology Center at Gödöllő.

- Androgenesis and Wheat Improvement 1988 /7 min/

The programme introducing some parts of the research work at the Cereal Research Institute in Szeged can be used as a guide for Hungarian and foreign specialists or in graduate and postgraduate education /in Hungarian and/or English/.

- Manipulation of Pig Embryos 1988 /5 min/

The film recording a result of the research work of Research Institute for Animal Breeding /Herceghalom/ can also be used by specialists and in the education at the secondary schools and universities /in Hungarian/.

- Sheep-Goat Chimaera 1989 /10 min/

The film introduces how Hungarian and Austrian scientists could develop a chimaera between animal species, what happened to him later, how the fact of chimaerism was proved /in Hungarian, German and English/.

- Biotechnology in Plant Breeding /13 min/

Collected assortment of programmes made in 1987 and 1988 by the OMFB, introducing the biotechnological work in plant breeding of 6 research institutes for educational purposes /in Hungarian/.

- Biotechnology in Animal Breeding /13 min/

The main concept of this film is the same as of the previous one, it shows the Hungarian results and methods of biotechnological propagation /in Hungarian/.

Further materials in preparation

- Plant Micropropagation 1989 /18 min/

This is a section in the educating programme called 'Plant Micropropagation' in Hungarian. We propose to use the whole programme but it can also be useful independently in the education. Produced and sold by: Edusystem GMK.

- The Transgenic Fish 1989 /10 min/

The method and results of the first Hungarian genetic recombination on an agricultural animal species realized by the co-operation of 5 research groups /in Hungarian/.

Further intended materials

- The Technique of Producing Monoclonal Antibodies 1990

As a section in the educational programme called 'Monoclonal Antibody Production'.

- The Technique of Embryo Transfer

As a section in the educational programme called 'Embryo Transfer of Farm Animals'. The listed completed materials are available for copying or buying.

The charges of copying:

| | |
|---|---|
| OMFB Biotechnology 1987 | 500 HUF |
| OMFB Biotechnology 1988 | 500 HUF |
| OMFB Biotechnology 1989 | 500 HUF |
| Wheat Improvement | 200 HUF |
| Embryo Manipulation | 200 HUF |
| Chimaera | 300 HUF |
| Plant Breeding | 400 HUF |
| Animal Breeding | 400 HUF |

The listed prices do not contain the VAT and the charge of the video cassettes.

For fixing the details search for Zsuzsanna Polka at ELTE Video Studio /H-1088 Budapest, Rákóczi ut 5, Phone number: 118-9833 or 118-7152

About the materials produced by the EDUSYSTEM you can gain information from dr. Zsuzsanna Celler, Phone number: 117-0439

If you have any request or idea concerning the topic please do not hesitate wright or ring me up.

Prof. Dr. László Kállai
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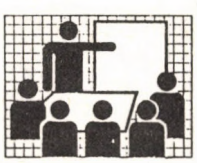

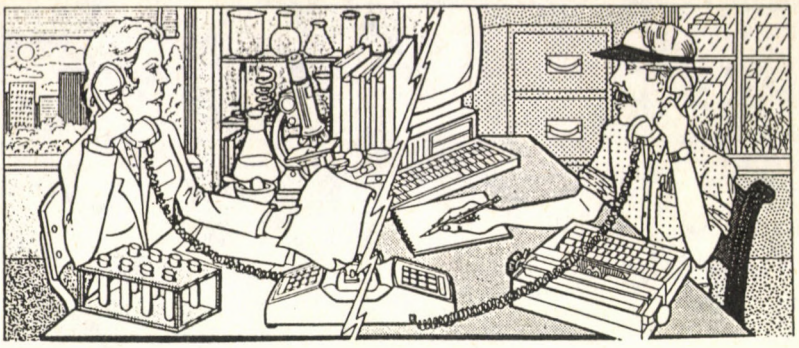

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# GENETIC ENGINEERING

ANTIPLASMID ACTION OF PHENOTHIAZINES AND RELATED COMPOUNDS
/J. Molnár and S. Földeák/
Abstracts of the 16th International Congress of Chemotherapy
Jerusalem /Israel/,
11-16 June, 1989

Plasmids are responsible for bacterial resistance to many unrelated antibiotics. The elimination and the inhibition of the transfer of plasmids is of a great importance. The authors report the effect of phenothiazine and anthracene derivatives on F' lac plasmid elimination and transfer inhibition of R144 plasmid of E.coli.
The electrochemical structure of the compounds was supposed to be responsible for the antiplasmid effects. The electromechanical structure of compounds was determined by Hückel and CNDO methods and their correlation to antiplasmid effects was studied by multiregression analysis.
The compounds which affect the membrane permeability and inhibit DNA-gyrase cause plasmid elimination in E. coli. Among phenothiazines 10-dimethylaminobutil-/2-chlor/-phenothiazine was the most effective in plasmid elimination but 3,7,8-trihydroxy-/2-chlor/-promazine was ineffective. The curing effect correlates with the superdelocalizibility of pi-electrons on the C-8, C-10 and N atoms of the phenothiazines. On the basis of this finding 3-/9-anthryl/-1-dimethylamino-prop-3-ene was synthetised which showed antiplasmid activity.
The results suggest that antiplasmid effect of certain phenothiazines and anthracene dervatives is due to increased membrane permeability and simultaneous inhibition of DNA-gyrase. The proved correlation between the antiplasmid effect and the unique electromechanical structure of tricyclic framework serves as an aid in the predictive antiplasmid drug design.

## STUDIES ON MITOCHONDRIAL DNA POLYMORPHISM AND PROTOPLAST FUSION IN BLACK ASPERGILLI

/J. Varga, Cs. Fekete, F. Kevei, and J.H. Croft/

Abstracts of the 19th Meet. FEBS, Rome 1989, MO 1

Mitochondria of some black Aspergilli were isolated by using Bead-Beater /Biospec Prod./, and mitochondrial DNAs were extracted by using the conventional DNA purification procedure. It was found that A. japonicus and A. carbonarius strains harbour guite large mtDNAs, of about 45 to 50 kbp. while strains belonging to the A. niger, A. phoenicis and A. awamori species carry mtDNAs about 30 to 32 kbp long. These strains can be classified into two well defined groups according to the electrophoretic patterns obtained with some restriction enzymes, such as PVUII, HaeIII and BgIII. There are small differences within these groups as well.

Hybridisation attempts were carried out by protoplast fusion to confirm the existence of these two groups. Hybrids could be isolated only when the partners were selected from the same group; partners belonging to different goups showed incompatibility.

The A. phoenicis and A. awamori strains are very similar to the A. niger strains. The results /mtDNA characterisation, protoplast fusion/ suggest that this observation coincides well with of Al-Musallam /1/, who classified these two taxons as subspecies of the Aspergillus niger species, on the basis of some morphological features.

## ISOLATION OF A DNA SEQUENCE STIMULATING RECOMBINATION IN YEAST

/M. Mink/

Acta Microbiologica Hungarica, 36: 61-65, 1989

A series of DNA sequences was rescued from the yeast Saccharomyces cerevisiae transformed by a gene library and selected for the cdc35ts$^+$, TRP1$^+$ phenotype. These sequences did not complement the cdc35ts mutation, and were found in various amounts and orientations in degraded plasmids. A similar phenomenon was demonstrated when the HIS3 gene was cloned into one of them: a highly deleted plasmid was rescued from complemented homozygous diploid yeast cells, in which the HIS3$^+$/his3$^-$ character was inherited at a 2:2 ratio. These results suggest that the insert sequences rescued from the cdc35ts transformants stimulate vigorous non-reciprocal recombination events by the transfer

of HIS3 gene or the TRP-ARS fragment. This event was detected in the transformation of cdc35 or his3$^-$ hosts and was followed by the reisolation of the degraded plasmid molecules.

CLONING AND EXPRESSION IN ESCHERICHIA COLI OF ENZYMATICALLY ACTIVE AVIAN SARCOMA VIRUS REVERSE TRANSCRIPTASE
/J. Molnár, A.A. Melnikov, P. Horváth, A.P. Tchernov, S. Dubne and I. Fodor/
Molecular Genetics /Life Sci. Adv./ 7: 27-31, 1988.

The entire pol gene of avian sarcoma virus was cloned into an expression plasmid vector under control of lac regulatory elements resulting in the plasmid pMF 14. Upon IPTG induction enzymatically active beta subunit of reverse transcriptase was expressed in E. coli pmF14. The recombinant protein having reverse transcriptase activity was purified in high yield by column chromatography, successively on DEAE-, phosphocellulose and heparinsepharose. The enzyme efficiently synthesized cDNA on primed rat liver poly /A/$^+$ heterogeneous nuclear RNA and rabbit globin mRNA.

ANALYSIS OF THE NUCLEOTIDE SEQUENCE OF THE STREPTOMYCES GLAUCESCENS TCML GENES PROVIDES KEY INFORMATION ABOUT THE ENZYMOLOGY OF POLYKETIDE ANTIBIOTIC BIOSYNTHESIS
/M.J. Bibb, S. Biró, H. Motamedi, J.F. Collins and C. Hutchinson/
The EMBO Journal, 8 /9/ 2227-2736, 1989

Key information about the biosynthesis of polyketide metabolites has been uncovered by sequence analysis of the tetracenomycin C polyketide synthase genes /tcml/ from Streptomyces glaucescens GLA.O. The sequence data revealed the presence of three complete open reading frames /ORFs/. ORF1 and ORF2 appear to be translationally coupled and would encode proteins containing 426 and 405 amino acids, respectively. The two deduced proteins are homologous to known beta-ketoacyl synthases. ORF3 begins 70 nucleotides after the stop codon of ORF 2 and would code for an 83 amino acid protein with a strong resemblance to known bacterial, animal and plant acyl-carrier proteins /ACP/. The presence of an ACP gene within the tcm gene cluster suggests that different ACPs are used in fatty acid and polyketide biosynthesis in Streptomyces. We conclude from these data and earlier information that poly-

ketide biosynthesis in S.glaucescens, and most likely in other bacteria, involves a multienzyme complex consisting of at least five types of enzymes: acylCoA transferases that load the acyl and 2-carboxyacyl precursors onto the ACP; a beta-ketoacyl synthase that, along with the acylated ACP, forms the polybeta--ketoacyl intermediates; a poly--beta-ketone cyclase that forms carbocyclic structures from the latter intermediates; a beta-ketoacyl oxidoreductase that forms beta-hydroxyacyl intermediates or reduces ketone groups in fully formed polyketides; and a thioesterase that release the assembled polyketide from the enzyme.

THE UV EXCISION-REPAIR SYSTEM OF SACCHAROMYCES CEREVISIAE IS INVOLVED IN THE REMOVAL OF METHYLCYTOSINES FORMED IN VIVO BY A CLONED PROKARYOTIC DNA METHYLTRANSFERASE

/Zs. Fehér, S. L. Schlagman, Z. Miner and S. Hattman/

Current Genetics, 16: 461-464, 1989.

DNA methyltransferase activity is not normally found in yeast. To investigate the response of Saccharomyces cerevisiae to the presence of methylated bases, we introduced the Bacillus subtilis SPR phage DNA-/cytosine-5/ methyltransferase gene on the shuttle vector, YEp51. The methyltransferase gene was functionally expressed in yeast the control of the inducible yeast GAL 10 promoter. Following induction we observed a time-dependent methylation of yeast DNA in $RAD^+$ and rad2 mutant strains; the rad2 mutant is defective in excision-repair of UV-induced DNA damage. Analysis of restriction endonuclease digestion patterns revealed that the relative amount of methylated DNA was greater in the excision defective rad2 mutant than in the $RAD^+$ strain. These data indicate that the yeast excision-repair system is capable of recognizing and removing $m^5C$ residues.

# IMMUNOLOGY

DOMINANCE OF RESISTANCE TO THE ALKYLATING AGENT 1.2:5.6-DIANHYDROGALACTITOL IN P388 MOUSE LYMPHOMA HYBRID CELLS

/I. Pályi, Judit Bence, K. Szikla and L. Hullán/

Cancer Chemotherapy and Pharmacology, 23: 41-46, 1989

Cultured P388/S mouse lymphoma cells resistant to 5-bromodeoxyuridine /BUdR/ and deficient in the midine kinase /$TK^-$/ were fused with P388/DAG cells resistant to 1.2:5.6-dianhydrogalactitol /DAG/, an anticancer alkylating agent, and to 6-thioguanine /6-TG/ and deficient in hypoxanthine phosphoribosyltransferase /$HPRT^-$/. Sensitivity to DAG in the hybrid line was very close to that in the P388/DAG line, which means that resistance to DAG was inherited in a quasi-dominant manner. Hybrid cells showed cross-resistance, similar to that of the DAG-resistant line, of two other hexitols, dibromodulcitol /DBD/ and di-succinyl-dianhydro-galactitol /DisuDAG/.

INTERFERON PRODUCTION BY NORMAL MOUSE TISSUES IN ORGAN CULTURES

/I. Rosztóczy, Klára Megyeri and M. Papós/

Journal of Interferon Research, 2: 515, 1989.

Freshly removed tissues of normal untreated mice produced relatively high amounts of interferon /IFN/ in organ cultures. Lymph nodes, subcutaneous tissue, and the capsule of the kidney were the most active IFN producers. The abdominal wall and the thigh muscle were less active, whereas the lungs and spleen, similarly to the peritoneal exudate and bone marrow cells, produced only threshold amounts of IFN. Liver cultures did not produce IFN under these experimental conditions. Cultures prepared from IFN-pre-treated animals produced three- to fourfold

more IFN. Homogenates of tissue prepared immediately after their removal did not contain a detectable amount of IFN. The bulk of the IFN activity was produced during the first 6 h of incubation at 37°C. Omission of serum from the culture medium, and the presence of 50 μg/ml of polymyxin B, did not inhibit IFN production. Cultures incubated at 0° did not release any IFN. The IFN activity produced by all types of tissue was pH 2 resistant and it was neutralized by an antiserum to murine /Mu/ IFN-beta. Different strains of mice produced comparable amounts of IFN under the present experimental conditions.

THE ROLE OF THE VARIOUS HUMAN PERIPHERAL BLOOD MONONUCLEAR CELLS IN THE PRODUCTION OF SENDAI VIRUS-INDUCED INTERFERON: IFN mRNA STUDIES
/I. Rosztóczky and M. Papós/
Journal of Interferon Research, 9: 349-352 /1989/

We have studied the relative contribution made ot the production of interferon /IFN/ in vitro in response to Sendai virus by the cells of different types present in human peripheral blood, with particular emphasis on the amounts of poly/A/ plus RNA extractable from each subpopulation and its content of IFN mRNA. Peripheral blood cells were fractionated by conventional techniques, and the amounts of IFN made after induction with Sendai virus were measured. The proportion of IFN-producing cells in the various fractions was determined by immunofluorescent staining. Poly/A/ plus RNA was extracted from each population and the content of IFN mRNA determined by microinjection into Xenopus laevis oocytes. Information obtained in these three ways was essentially concordant, and showed that monocytes and E rosette-negative lymphocytes predominantly contribute to IFN production.

ESSENTIALLY PURE MURINE INTERFERON-ALPHA/BETA PRIMES POLY rI:rC AND SENDAI VIRUS-INDUCED INTERFERON PRODUCTION IN MICE
/I. Rosztóczy and K. Megyeri/
Journal of Biological Regulators and Homeostatic Agents, 3:/1/, 35-38, 1989.

Intramuscular /i.m./ injection of mice with 2000 IU/g of essentially pure murine interferon-alpha/beta /MuIFN-alpha/beta/ 3 h before the induction of IFN by on intraperitoneal /i.p./ inoculation of 10 haemagglutinating units /HAU/ per g Sendai virus or 3 μg/g polyriboinosinic and polyribocytidylic acid complex /poly rl:rC/ elicited a primed IFN response in both cases.Anti-

serum to MuIFN-alpha/beta neutralized both the priming and antiviral activities of the IFN preparation used. Comparison of the kinetics of primed and unprimed IFM production by Sendai virus indicated that the early /2-4 h/ period of IFN production was affected /J. Biol. Regul. Homeost Agents, 1989; 3: 35-8/.



continued on p.32.

# TOXICOLOGY

TOXICAL EFFECT OF RETIONIC ACID MONOLAYER CULTURE OF EMBRIONAL CARCINOMA CELL LINES
/P. Imrik and Emily Madarász/
Cytotechnology, 5: 42 /1989/

Murine embryonal carcinoma cells are induced to differentiate when cultured in presence of retionic acid. We found a different effect of retionic acid on protein content and proliferation activity of PCC-7 embryonic carcinoma cell cultures when cells are cultured in aggregates or on solid surfaces.
The presented cytotoxical tests suggest that retionic acid is highly toxical on monolayer culture of PCC-7 however cell of cultures from retionic acid treated aggregates develop into neuronal and glial direction.



continued on p.37.

# HEALTH AND HYGIENE

FIBRONECTIN IN BRONCHOALVEOLAR LAVAGE FLUID AND PLASMA FROM CHILDREN WITH CHRONIC INFLAMMATION OF LUNGS

/B. Nagy, Éva Katona, J. Erdei, E. Székely, T. Márialigeti, L. Karmazsin and J. Fachet/

Acta Paediatr Scand, 72: 727-733, 1989.

Fibronectin/albumin ratios in plasma and in bronchoalveolar lavage fluid were evaulated in patients /1-6 years of age/ with recurrent obstructive bronchitis and different interstitial lung diseases. These inflammatory reactions were characterized by increased influx of macrophages on the bronchoalveolar surface, but an increase in the proportion of lymphocyte-macrophage or neutrophil-macrophage alveolitis. There was no considerable difference in plasma fibronectin concentrations obtained from healthy children and patients with moderate obstructive bronchitis and slight inflammation of the bronchial mucosa observed bronchoscopically. Levels of plasma fibronectin were elevated in patients with serious bronchial inflammation and different alveolitis, but they were within the normal range. A comparison of lavage fibronectin/albumin ratios with plasma fibronectin/albumin ratios indicated significant local productions of fibronectin in subjects with serious bronchial inflammation and interstitial lung disorders. Fibronectin detected on the bronchoalveolar surface seems to be an important factor in mediating cell-to-cell interactions in the repair of the bronchoalveolar structures, and in tracing the activity of the inflammatory reactions not only in patients with interstitial lung diseases, but also in patients with serious chronic bronchial inflammation.

FIBRONECTIN ON THE BRONCHOALVEOLAR SURFACE IN CHILDREN WITH RECURRENT OBSTRUCTIVE BRONCHITIS

/B. Nagy, Éva Katona, J. Erdei, L. Maródi, E. Székely, T. Márialigeti, L. Karmazsin and J. Fachet/
Acta Paediatrica Hungarica, 29: 261-269, 1989.

Fibronectin is normally present in the lower respiratory tract. Significantly increased levels of it were detected in the lavage fluid in patients with interstitial lung diseases. Because this molecule appears to mediate a number of components of the inflammatory process, we evaluated the status of fibronectin in plasma and bronchoalveolar lavage in patients with recurrent obstructive bronchitis when signs of severe chronic mucosal inflammation were observed bronchoscopically. There was no considerable difference in plasma concentrations of fibronectin obtained from healthy children and patients. A comparison of lavage fibronectin/albumin ratios with plasma fibronectin/albumin ratios suggested significant local production, especially when the lavage and plasma ratios were measured in the same patients. Phagocytic activity of alveolar macrophages and blood granulocytes from the same patients was enhanced at both concentrations fibronectin used. This concentrations referred to values quantified in the lavage fluid. The metabolism of fibronectin seems to be an important factor in tracing the inflammation process not only in adults with chronic interstitial lung diseases, but also in children with recurrent obstructive bronchitis.

RELATIONSHIP OF E1 AND E3 REGIONS OF HUMAN ADVENOVIRUS 35 TO THOSE OF HUMAN ADENOVIRUS SUBGROUPS A, C AND D

/W.Gy. Kang, Gy. Berencsi, A. Bánrévi, Z. Ascher, G. Fejér, Mária Takács, A. Kiss and I. Nász/
Acta Microbiologica Hungarica, 36: /4/ 443-455, 1989.

Cloned PstI fragments of human adenovirus 35 /AV35/ genome were compared with the DNA of representatives of human adenovirus subgroups A /type 12/, B /type 7/, C /types 1 and 5/, D /type 8/, and E /type 4/, using blot hybridization techniques. The E 1 b region of AV35 was found to be more distantly related to those of other subgroups than E1a regions sequences and examined by others. DNA hybridization was observed only between E1b of AV35 and the DNA of AV4, thus the recombinant constructed might be applied as B-subgroup-

specific diagnostic probe. Common nucleotide sequences were detected withing the E3 regions of serotypes 1, 4, 5, 7, 8 and 35. On the basis of inter-subgroup homology, and PstI-fragments it may be concluded, that the structure of E3 sequences of Av7 and Av35 DNA are closely related to those of AV3 DNA sequenced by Signäs et al. /18/. E4 regions were compared only of serotypes representing subgroups B, C, and D. These sequences were sub-group specific, similarly to E1b regions.

MOLECULAR CLONING AND PHYSICAL MAPPING OF THE DNA OF HUMAN ADENOVIRUS TYPE 35
/W.Gy. Kang, Gy. Berencsi, Mária Takács, Z. Ascher, G. Fejér and I. Nász/
Acta Microbiologica Hungarica, 36: /1/, 67-76, 1989.

The prototype strain of the human adenovirus type 35 /AV35/ was examined. BamHI, EcoRI, HindIII, KpnI, PstI, and SalI restriction endonucleases were used for the mapping of DNA fragments. Three original maps were constructed, and previously published maps were somewhat modified. A PstI-specific fragment library was also prepared and characterized using the pBR322/E. coli system. Some of the recombinants seem to be applicable for rapid DNA diagnostics, and for the comparative mapping of type- and subgroup-specific DNA sequences. The comparative presentation of physical maps of subgroup B human adenoviruses might improve the efficiency of genotyping of adenoviruses using restriction endonucleases.

PROSPECTS FOR THE CONTROL OF AIDS PATIENTS BY INTRODUCING DEFECTIVE-HIV HARBOURING LEUKOCYTES
/Gy. Berencsi, J. Minárovits, I. Nász and I. Földes/
Medical Hypotheses, 30: 223-228, 1989.

Introduction of leukocytes harbouring an artificially constructed defective HIV provirus into AIDS patients may result in inducing superinfection resistance against HIV and interfering with HIV receptors or replication of HIV. All these may slow down progression of the disease.

ANTIMICROBIAL AND IMMUNOMODULATING EFFECTS OF SOME PHENOLIC GLYCOSIDES
/J. Molnár, Gyöngyi Gunics, Ilona Mucsi, M. Matsumoto and I. Nisinoka/
A. Microbiologics Hungarica, 36: /4/, 423-430, 1989.

Several phenolic glycosides,i.e. acteoside, desrhamnosyl acteoside, and purpureaside A, B and

C, exerted weak antibacterial effects on Escherichia coli. Acteoside had antiplasmid effects, including F'lae plasmid elimination, and inhibited kanamycin resistance transfer in E. coli. Acteoside, desrhamnosyl acteoside and purpureaside A displayed antiviral effect on Aujeszky-virus. All of the phenolic glycosides decreased some human leucocyte functions, including rosette formation, mitogen-induced blast transformation and phagocytic activity in vitro. The purpureaside C had significant proinflammatory action, however, other phenolic glycosides showed neither proinflammatory nor antiinflammatory effect on carrageenan-induced inflammation in vivo.

HETEROGENEITY OF THE RESPONSE TO INDUCERS OF DIFFERENTIATION AND TO CYTOSTATICS OF TUMOR CELL POPULATIONS

/I. Pályi/

Path. Res. Pract. 184: 11-17 1989.

The purpose of the experiments was to establish whether individual cells of a tumor cell population, or clonal lines derived from it express the differentiated phenotype, or respond heterogeneously following treatment with inducers of differentiation or with cytostatic drugs. The human cell lines used in this study were: HL-60 promyelocytic leukemia, K562 erythroleukemia, BHM-97 and A2058 melanoma, and A-1, A-2, A-4 and A-6 clones of A2058 line. Inducers of differentiation were phorbol myristate acetate /PMA/, dimethyl-sulfoxide /DMSO/ and retinoic acid /RA/; cytostatics: adriamycin /ADM/,5-fluorouracil /5-FU/, dacarbazine /DTIC/, cis-platin /Platidiam, PD/ and arabinosyl cytosine /ara-C/. Expression of the differentiated phenotype was shown by cell attachment /HL-60/, hemoglobin production /K562/, dendrit formation /A2058, BHM-97/. Individual cells expressed the differentiated phenotype heterogenously in all types of cell populations. Clone A4 was the most, and clone A-6 the least sensitive to PMA. The drug sensitivity of the clones was different and drug-dependent. It is concluded that induction of differentiation as another approach to therapy of cancer, similar to anticancer drug therapy, also implies disadvantages due to population heterogeneity. Combinations of cytostatics with differentiation inducers might result in improved therapeutic effects.

# PHARMACOLOGY

GENETIC RECOMBINATION BY SPHEROPLAST FUSION OF STEROL-TRANSFORMING MYCOBACTERIUM STRAINS /Antónia Jekkel, Éva Csajági, Éva Ilkőy and G. Ambrus/ Journal of General Microbiology, 135: 1727-1733, 1989.

Wall-deficient forms of fast-growing micobacteria were produced in growth medium containing vancomycin and glycine, and spheroplasts were prepared by lysozyme treatment of wall-deficient cells. Spheroplasts gave rise to recombinants with high frequency /2-6%/ when they were fused using polyethylene glycol 6000. The results demonstrated that in vivo genetic recombination could be used to produce genetically modified Mycobacterium strains with applications in transformation of steroids. Useful intermediates of steroid drug synthesis and new degradation products were obtained from sterols by selected recombinant strains.

# BIOENGINEERING

## PREPARATION, CHARACTERIZATION, AND APPLICATION OF A NOVEL IMMOBILIZED CARBOXYPEPTIDASE B

/P. Südi, Erzsébet Dala and B. Szajáni/

Applied Biochemistry and Biotechnology, 22: 31-43, 1989.

Pig pancreas carboxypeptidase B has been immobilized by covalent attachment to a polyacrylamide-type bead support possessing carboxylic functional groups activated by water-soluble carbodiimide. The optimum conditions of immobilization were determined. The activation of the support and the coupling reaction were performed in 0.1 M sodium citrate/ /sodium phosphate buffer /pH 4.5/ using a support carbodiimide-enzyme weight ratio 4:8:1 at 0.4°C. Under such conditions the highest activity achieved was 6700 U/g solid. The catalytic properties and stability of immobilized carboxypeptidase B were studied and compared with the corresponding properties of the soluble enzyme. The specific activity of the immobilized enzyme calculated on bound protein basis was about 70% of that of soluble enzyme. The optimum pH for the catalytic activity of the immobilized carboxypeptidase B was practically identical with that of soluble enzyme /pH 7.6-7.7/. The apparent optimum temperature of the immobilized carboxypeptidase B was about 7°C higher than that of the soluble enzyme. With hippuryl-L-arginine as substrate, $K_{mapp}$ value of the immobilized enzyme was tenfold higher than the $K_m$ value of the soluble enzyme. The conformational stability of the enzyme was markedly enhanced by the strongly hydrophylic microenvironment in a wide temperature and pH range. The immobilized carboxypeptidase B was used for stepwise digestion of cytochrome C.

INFLUENCE OF pH ON THE GROWTH AND ETHANOL PRODUCTION OF FREE AND IMMOBILIZED SACCHAROMYCES CEREVISIAE CELLS

/Zs. Buzás, K. Dallmann and B. Szajáni/

Biotechnology and Bioengineering, 34: 882-884, 1989.

The fermentation capacity of immobilized Saccharomyces cerevisiae cells was found to be practically independent of the hydrogen ion concentration between pH 2.5 and 6.2. The results indicate that the cells entrapped in Ca-alginate gel are protected from alterations of the environmental conditions. This surmise is also supported by the cell viability. The fermentation of different sugar containing raw materials /molasses, fruit juices, sweet sorghum/ can be performed without previous pH adjustment. The long-term effect /720 h/ of the environmental hydrogen ion concentration on the fermentation capacity of immobilized yeast cells was studied in the course of repeated batch processes. During the long term application the fermentation capacity and cell viability significantly decreased only below pH 3 according to the results of short time experiments.

GENETIC IMPROVEMENT OF BACILLUS LICHENIFORMIS FOR INDUSTRIAL FERMENTATION

/A. Holczinger, Z. Prágai, L. Székely and I. Sik/

Proc. 5th Sci. Symp. of Soc. Countries on Biotechnology at Balatonszéplak, 4-8 Sept. 1989. pp. 133-134.

Bacillus licheniformis, the Gram$^+$ bacterium is producing bacitracin antibiotic utilized as additive in fodder mixtures. To improve the industrial strain applied, two tasks had to be solved: the frequent lysis and the variable productivity found in batch-fermentations.

The lysis was due partly to spontaneous induction of the lysogenic industrial strain, partly to virulent phage infection. Three temperate phages carried by the strain and one virulent phage was identified. These were characterized morphologically, by their infection specificity and by DNA endonuclease fragment patterns. No relation was found between the phages by DNA hybridization.

The spontaneous induction could be controlled by phage interactions and careful growth conditions. Classical phage resistance through cell wall receptor mutation of the host bacterium was found unstable, so internal immunity against the virulent phage had to be introduced to

the fermenting strain by fusion with a bacitracin non producing, suitably immune donor.
In order to develop a genetic manipulation system with cloning possibilities protoplast transformation was worked out for the plasmids of pUB110 /4.5 kb/ with Km, Phl resistance and pTV1 /12.4 kb/ with Cm resistance and carrying Tn 917 with Erythromycin inducible MLS resistance.
In the procedure increased regeneration up to 80-90% was achieved in rich nutrient medium with saccharose to maintain osmotic conditions at pH 8. Even after PEG treatment regeneration decreased only to 50-55% and 20-40% of the growing cells were transformants. The same frequency of transformation was found with a one step selection using only 5 $\mu g.cm^{-3}$ Km.
Lower frequency of transformation was the result with pTV1 partly because of low copy number of this plasmid and smaller yield in the preparation, partly because of its bigger size.
Transposon mutagenesis could be carried out with the pTV1 transformants because of the thermosensitivity of the plasmid at $45^{o}C.5\text{-}6.10^{-5}$ transposition was detected by selecting $ery^{r}$ derivates and auxotrophes as well as mutants in bacitracin synthesis were selected.

USING OF DIFFERENT PRODUCTS FOR SUBSTITUTION OF AGAR IN THE PLANT MICROPROPAGATION IN VEG-BOX PLASTIC CONTAINER
/M. László and M. Fári/
Napjaink Biotechnológiája, 20: 51 /1989/

Since micropropagation in entering to commercial use, it has been stated that the major cost is due to labor, microbial losts, energy costs and plant quality. After analysing the steps needed to be reorganized, improved or automatized, we proposed an integrated system called PROPOMATIC. It consists of a new plastic container "VegBox", a high sterile automat to dispense and manipulate media and containers "Clonomatic", and a substitute to agar.
A new product to be used instead of agar has been developed. The substituant is put in the VegBox, these are piled up, packaged and gas sterilized before to be filled with medium. Up to now one kind of synthetic substitute has been successful for multiplication and rooting of different species.
In this study we investigated the growing of strawberry plants in standard glass container and VegBox container using agar and a synthetic substitute instead of agar, and with or without active carbon. We concluded, that the

maximum growth of strawberry plants was obtained by using of synthetic agar substitute in Veg Box container, with active Carbon.

INVESTIGATION OF ALKALOIC PRODUCTION BY CELL TISSUE CULTURE OF CATHARANTHUS ROSEUS

/M. László, Julianna B. Szabó, Zsuzsanna T. Hervay and I. Bérci/

Proc. of the 5th Sci. Symp. of Soc. Countries on Biotechnology Balatonszéplak, 4-8 Sept, 1989.

A cell line of Catharanthus roseus /L./ G. Don was characterized with respect to its biosynthetic capabilities for indole-alkaloids, in callus tissue culture conditions. The effect of the pH of the medium and of phytohormones on the production of alkaloids was the subject of our investigations. The fresh weight, dry matter and total alkaloid content of calli were determined. We found, that the pH 5.8-6.0 were optimal for the production of total alkaloids. The combination of 1 mg/l IAA and 0.2 mg/l kinetin in the medium was appeared the most suitable for maximal alkaloid production of our cell line. The cells were grown on Murashige and Skoog medium in specific VegBox$^{R}$ plastic containers in dark room at 25$^{o}$C, for 21 days.

PLASMID STABILITY OF RECOMBINANT DNS STRAINS

/P.A. Ballagi, T. Illeni, B. Sevella, Gy. Rajkai and L. Nyeste/

Folia Biotechnologica 1-31, 57, 1989.

Modern biotechnology industry based on the mass production of genetically manipulated cells of microorganisms uses the same well proved culture techniques and bioreactors as the classical fermentation industry. However, fermenting these strains one must take into consideration that the physiology of manipulated cells is different from that of the wild type cells',and that the preparation of plasmid coded product means a metabolic burden for the cells. Thus they are in a so-called selective disadvantage to the cells which do not carry a plasmid /or more exactly a new genetic characteristic/.

This publication deals with the problems of plasmid stability. It makes a detailed study of the mathematical models meeting requirements of plasmid stability during the culture of plasmid-carrying microorganisms.

DISINTEGRATION OF MICROBIAL CELLS

/M. Pécs and L. Nyeste/

Folia Biotechnologica, 37: 1-48, 1989.

This publication deals with the laboratory or industrial scale disintegration methods of microbial cells produced by fermentation. It presents the necessary knowledge about the cell wall structure for developing of more efficient processes and the most important analytical methods as well.

ANALITICAL AND AUTOMATION PROBLEMS OF FERMENTATION PROCESSES

/L. Nyeste, M. Pécs, L. Szigeti, E. Pungor, Jr./

In: MARKKANEN, K. Makinen: Second Finnish-Hungarian Round--Table on Biotechnology, Technical Biochem. Report, TKK-KeBM I/1989, Helsinki

Applicability of a computer-coupled autoanalyzer-fermentor system has been presented for qualitative and quantitative study of the metabolism of various fermentations. It has been demonstrated that the system is capable of on-line monitoring and controlling processes for the analysis of synthetic and industrial media. The system offers useful information on the further development of fermentation of both primary and secondary metabolites, and can be easily adapted to various analytical methods and the study of broths of different material quality.

A quadrupole mass spectrometer /QMS/ system was constructed to analyse gases, volatiles and some of the non-volatiles involved in fermentation processes. Both dissolved and free gases measured. Dissolved and exhaust $O_2$, $CO_2$ and propanol are measured on-line manner. $N_2$ is used as internal standard. Off line analysis of $CO_2$ chemically bound in liquid phase demonstrates, that the changes of /hydro/ carbonate content of the broth, have to be taken into account at the calculation of respiratory quotient. Ammonia, 2-ketoglutaric acid and pyruvic acid and penicillin were also measured off-line manner, too.

# FOOD INDUSTRY

ENZYMIC MODIFICATION OF FOOD PROTEINS PART 2 INVESTIGATION OF ENZYMIC PEPTIDE MODIFICATION OF FOOD INDUSTRIAL PURPOSE

/Anna Halász and Gyöngyi Hajós/

Élelmezési Ipar, XLIII /12/ 429-435, 1989.

The enzyme peptide modification is a procedure demanding enzyme catalysis. It is suitable for the controlled modification of amino acid content of the given proteins. The conditions of the reaction have to be chosen first of all according to the properties of the protein to the planned end product. Most probably, both spliting and formation of peptide bounds take place in the enzymic process. The change in the number and space of peptide bounds may respond to the mode of reaction. It is probable that during enzymic peptide modification, and hydrophobic bounds are also formulated, however, due to the further processing of the products /e.g. dialysis and lyophilization or membrane filtration and drying/, their role is not determinative in the practical utilization. Discrepancies in the literature concerning the mechanism of the reaction have to be solved. According to literary data, some application possibilities of the enzymic peptide modification, like the change of functional properties and primarily the planned modification of the consistency of proteins may successfully be utilized both in the food industry and in nutriment production.

RECENT RESULTS OF AMYLOLYTIC ENZYME RESEARCH

/A. Hoschke/

Élelmezési Ipar, XLIII /9/ 318-321, 1989.

The article reports on the amilolytic enzyme research performed at the Food Biotechnology Division of the Central Food Research Institute. It introduces the results of complex stock improvement programme for improving the production of B. licheniformis thermostabile alfa-amylase and A. niger glycoamylase and also the results of enzyme fermentation optimization which bases the industrial glycoamylase production.

APPLICATION OF IMMUNE-ANALYTICAL METHODS IN THE EXAMINATION OF FOOD

/Éva Gelencsér/

Élelmezési Ipar, XVIII. /11/ 406-410 /1989/

In the first part of the series of articles the authors compare the various methods used for determining the origin of food components, the microbiological and hygienic states of foods. Special interest is shown in the application of immune-analytical methods. Following the literary summary, the authors give the results of their own experiments performed with plasma produced against soya and milk protein.

Rabbit serum against the 11S soya protein was used to examine how the type and the level of processing and also the presence of different food affect the immunochemical detection of soya. The reliability of the methods and the detectivity were also tested. With serum produced against casein the antigeneity of hydrolyzed products were tested.

In the framework of the series of articles the authors, with own results, wish to call the attention of food industrial experts to the application of the quick methods of specific and high sensitivity which has a minimum instrument requirement.

ENZYMIC MODIFICATION OF FOOD PROTEINS PART 3. COVALENT LINKAGE OF AMINO ACIDS INTO THE PROTEIN CHAIN

/Gyöngyi Hajós and Anna Halász/

Élelmezési Ipar, XLIII /1/ 2-6 1989.

In the course of enzyme peptide modification /EPM/ the method and level of amino acid linkage were examined and the free amino acid link was not found favourable, however, 2-15% /in total amino acid percentage/ methionine enrichment was achieved with the ester derivates of amino acids. With several separate methods, i.e. by determining the correlation between the amount of methionine linkage and that of methanol released in the reaction mixture, and also by exopeptidase cleaving of the amino acids in peptide chains one by one, it was proved that in proteins enriched with methionines the methionine links to the peptide chain by covalent bond.

Exopeptidase digestion proved that Met links to the protein chain primarily as the terminal amino acid of peptides.

CHARACTERIZATION OF SACCHAROMYCES CEREVISIAE PROTEINASES
/Anna Halász, Mária Szakács--Dobozy, Gyöngyi Hajós, B. Mátrai, Ilona Szalma--Pfeiffer/
Élelmezési Ipar, XLIII /9/ 322-325, 1989.

The results of research work show that the activity of S. cerevisiae proteinase changes during the cell cycle, with multiplication phase during batch fermentation. The activity values are also modified by glycose concentration and aeration. The S. cerevisiae C-Y enzyme successfully catalyses the EPM reaction.

IMMOBILIZATION OF PIG MUSCLE ALDOLASE ON A SILICA-BASED SUPPORT
/L. Horváth, Magdolna Ábrahám, L. Boross and B. Szajáni/
Applied Biochemistry and Biotechnology, 22: 223-235, 1989.

Pig muscle aldolase was covalently attached to a silica-based support possessing aldehyde functional groups. The activity of the immobilized enzyme was 37 U/g solid, and the specific activity calculated on a bound protein basis was 1.9 U/mg protein. The optimum pH for the catalytic activity was pH 7.5. The apparent optimum temperature was found to be 45°C. The $K_m$ app value of the immobilized aldolase with D-fructose 1.6-diphosphate as substrate was $1.25 \times 10^{-4}$M. The conformational stability was improved by the immobilization. The immobilized aldolase was used for the continuous splitting of D-fructose 1.6-diphosphate.

THE FIRST TRANSITION POINT OF THE MUTANT cdc2.33 IN THE FISSION YEAST SCHIZOSACCHAROMYCES POMBE
/B. Novák and J.M. Mitchison/
Journal of Cell Science, 94: 657-662, 1989.

We show that the first of the two transition points of cdc2.33, a mutant of Schizosaccharomyces pombe, exists in exponential phase cells. Using flow cytometry and a double-block experiment, we have measured the position of this transition point both in the single mutant and in the double mutant cdc2.33 weel.6. In the single mutant, this point is in early $G_1$. In the double mutant, however, this point is only delayed slightly, if at all, despite much larger delays in the S period and in the transition point of cdc10, another 'start' mutant. There is therefore a significant dissociation in the timing of what are thought to be two start events, and the first one appears not to be subject to

a size control and to be associated with the completion of mitosis rather than $G_1$/S boundary.

CLONING OF THE ALPHA-AMYLASE GENE FROM BACILLUS LICHENIFORMIS
/Éva Vincze and Á. Hoschke/
Proc. of the 5th Sci. Symp. of Soc. Countries on Biotechnology, Balatonszéplak 4-8 Sept., 1989.

A gene library was constructed from B. lichenoformis using a novel vector and cloning strategy. Clones carrying the thermostabile slpha-amylase gene were successfully isolated.

THE PROTEASES OF YEAST
/Anna Halász, Mária Szakács--Dobozi, Ilona Szalma-Pfeiffer
Abstracts of the 4th Trilateral Conf. on Yeast Sárospatak, 24-28 July, 1989.

Crude extract of sonicated baker's yeast was separated by preparative isoelectric focusing /IF/ and the different protease activities /A, B, Y/ were determined. Main protease B activity was found in the range pI 4.77 - 5.66, the protease Y fractions covered the range pI 6.12- 6.61, while the peak pI 7.87-8.20 seemed to be protease A. Of the fractions investigated by SDS gelelectrophoresis several were found to contain bands with similar molecular weights. Rabbit antisera produced against the three main proteases were used to investigate changes in the intracellular protease activity determined by Anson method.
The affinity of the polyspecific antisera against the antigens was not influenced by the fact whether the enzymes were in their active form or inactived. Increase in protease activity in the exponential growth phase compared to the inoculum stage is not only a result of enzyme activation but can be related to de novo synthesis of protease A and B. Activity changes in the transient phase from exponential to the stationary stage are dominantly caused by changes of the active form at 0.1% glucose concentration.
At higher glucose content, however, also de novo synthesis of B has a role.
Activity changes at constant glucose concentration and different aeration intensities are a result of enzyme activation as enzyme concentrations are constant.
ELISA investigation of yeast fractions separated by preparative IF shows that all the antisera give serological reactions with all the fractions.Fractions separated between the two peaks of considerable activities were found to be the strongest antigens. These components show very low protease activities. This

might be explained by the presence of protein fragments of low molecular weight, giving positive serological reactions.

THE EFFECT OF DATE SYRUP CONCENTRATION ON GROWTH RATE, PROTEIN, RNA CONTENT AND PROTEASE ACTIVITY OF S. CEREVISIAE, C. GUILLIERMONDII AND R. GLUTINIS
/M.K. Mustafa and Anna Halász/
Acta Alimentaria, 18: /2/ 177-192, 1989.

With increasing date syrup content of the fermentation medium, growth rate of S. cerevisiae, C. guilliermondii and R. glutinis increased. Protein content of S. cerevisiae increased in the range of 0.1 to 0.3% date syrup concentration. The whole synthesized protein increases at higher date concentration for each strain. RNA content of the investigated yeast strains varied with date syrup concentration and strain as well. For S. cerevisiae increase in carbon source concentration caused a gradual increase in RNA. C. guilliermondii seemed to be independent of date syrup concentration in this respect. The proteinase activity at the end of fermentation was highest in S. cerevisiae with maximum value at 0.5% date syrup concentration, C. guilliermondii showed similar variation in protease activity as S. cerevisiae, but the absolute values were significantly lower in each case. Our experiments showed that date syrup is a good substrate for yeast strains of different genera. For biomass production C. guilliermondii and R. glutinis gave much better results in cell concentration than S. cerevisiae.

APPLICATION OF IMMUNOLOGICAL METHODS IN THE CHARACTERIZATION OF BAKER'S YEAST
/Mária Szakács-Dobozi, Anna Halász, Ilona Szalma-Pfeiffer/
Abstracts of the 4th Trilateral Conf. on Yeasts, Sárospatak, 2-28 July, 1989.

Alteration of cell wall structure in Saccharomyces cerevisiae and the properties of compounds released during sonication and heat-treatment were investigated by Enzyme-linked Immuno-sorbent Assay /ELISA/ and proteolytic activity methods.
Different serological reactions were detected for Saccharomyces cerevisiae after heat treatment at different temperatures depending on the fact, whether the samples were sonicated or not. Cell-free extract gave higher antigenic responses than the samples containing cell wall. As the antisera were developed against cell-free fractions of yeast, the positive reaction of the yeast containing cell wall might be due either to

the serologically active components released during heat treatment or to antigenically related cell wall components.
No relation was found between antigenic responses and heat-treatment of the crude cell-free extract of baker's yeast treated at different temperatures.
As proteolytic activities were found to decrease, the results support the theory that immunoactivity is related to protein structure.

CARBOHYDRATES UTILIZATION DURING GLUCOAMYLASE FERMENTATION
/G.F. Kluppné and Á. Hoschke/
Proc. of the 5th Sci. Symp. of Soc. Countries on Biotechnology, Balatonszéplak, 4-8 Sept., 1989.

During the fermentation of glucoamylase one part of the carbon source is usually insoluble so it is difficult to separate the fungus from the unused substrate. For this reason the measuring of growth by general dry weight method is hampered, however it would be important for carbohydrate utilization and economic point of view.
To solve this problem an exact sugar distribution and totally soluble substrate-maltodextrin /Sowflake$^{R}$ CPC product/ was used. The selected strain of Aspergillus niger ATCC 22343 was grwown in a liquid defined minimal medium supplemented with 10% maltodextrin.
The utilization of carbon source was studied by measuring the synthetic efficiency /the quotient of dry weight of mycelium and weight of carbon source consumed expressed as percent/. The breakdown products from the enzymic hydrolisis of maltodextrin during fermentation was analyzed with high-performance liquid chromatography /HPLC/ and thin-layer chromatography. Changes in levels of glucoamylase activity in ferment broth was determined by Miles method.
The results of these experiments indicate the relation between the production of enzyme and the consumption of particular carbohydrates. Further advantage of these methods that glucoamylase expression and the feedback inhibition can be studied in industrial condition, too.

ALLERGENIC CHARACTER OF COW'S MILK PROTEINS MODIFIED BY BIOCHEMICAL PROCESSES
/Gyöngyi Hajós, Éva Gelencsér and M. Polgár/
FEBS '89 Abstract Book, FR 352.

The extent of the modification in the allergenic properties of cow's milk proteins treated by biochemical processes was studied in the sera of cow's milk protein intolerant children.

Cow's milk protein allergy was measured by immunofluorescent method detecting IgG antibodies. Antibody positive sera of high titer were used for investigation of the relationship between the allergenic character and the protein structure. Allergenic properties of heat treated, fermented, enzymatically hydrolised and enzymatically modified peptides were compared with cow's milk and casein.

The results showed no significant change in the allergenic properties of heat treated and fermented products, but the antigeneity of enzymatically hydrolised proteins has significantly dropped because of the cleavage of a great number of peptide bonds. The most significant decrease in the allergenic properties was measured in the product of designed amino acid contant, produced by enzymatic peptide modification. This favourable effect might be due to a transpeptidation process during the enzyme catalyzed reaction.

These experimental results suggest that the enzymatically modified proteins are available for the nutrition of patients of cow's milk protein allergy.

APPLICATION OF IMPROVED YEAST STRAINS IN BREWERY

/F. Zákány, Margit Lovenyák, Anna Maráz and Judit Rezessy--Szabó/

Proc. of the 5th Sci. Symp. of Soc. Countries on Biotechnology, Balatonszéplak, 4-8 Sept. 1989.

A breeding program was developed for improving brewers' yeast strains applied in Borsod Brewery /Bőcs/.

An attempt was made to decrease production of undesirable aromas /e.g. diacetyl/ by mutagenesis. Diacetyl resistant mutants were isolated following MNNG treatment and their fermentation characteristics were studied. Protoplast fusion technique was applied to transfer $\underline{FLO}^{+}$, $\underline{MAL}^{6}$ or $\underline{KTL}^{+}$ genes of haploid laboratory strains into brewing ones. Brewing yeast strains with enhanced flocculation ability which retained the good fermentation characteristics under laboratory conditions were selected. Zymocin producing /killer/ strains were constructed by transferring dsRNA killer plasmids from Saccharomyces cerevisiae to brewing yeast strains. Genetic stability of improved strains was fairly good and they produced zymocin during wort fermentation and lagering under laboratory conditions as well as in pilot plant fermentation. The qual-

ity of beer produced by killer strains was better than that of the control one.

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continued on p.63.

# PLANT BREEDING

INCREASE OF GREEN PLANT REGENERATION EFFICIENCY BY CALLUS SELECTION IN PUCCINELLIA LIMOSA /SCHUR./ HOLMBG.

/L.E. Heszky, D.Q. Binh, E. Kiss and G. Gyulai/

Plant Cell Reports, 8: 174-177, 1989.

Three main types of callus have been selected from seeds of salt marsh grass /Puccinellia limosa /Schur./ Holmbg./ subcultured on Murashige and Skoog medium supplemented with 2.4-dichloropenoxyacetic acid and kinetin. Callus type I differentiated only occasionally. Callus type II produced roots but no shoots under all tested culture conditions. Both green /47%/ and albino plants have been obtained from the embryogenic callus type III. Callus type III was divided into subtypes /greening and non-greening/ according to the presence or absence of green spots. Separated greening embryogenic callus gave up to 87% green plants, whereas non-greening callus produced only 4%.

PLANT REGENERATION FROM CALLUS OF PUCCINELLIA DISTANS /L./ PARL

/D.Q. Binh, L.E. Heszky, G. Gyulai, E. Kiss and A. Csillag/

Plant Cell, Tissue and Organ Culture, 18: 195-200, 1989.

Callus was induced from seeds of Puccinellia distans /L./ Parl on MS medium supplemented with 2 $mgl^{-1}$ 2.4-dichlorophenoxyacetic acid and 0.5 $mgl^{-1}$ kinetin. Morphogenesis initation was achieved during subculture on medium containing 0.1 $mgl^{-1}$ 2.4-D. From the point of morphogenetic capacity, 3 types of callus were selected. High frequency of plant regeneration was obtained by selection of embryogenic type of callus, and culture on $N_6$ medium and $N_6$ medium supplemented with kinetin /5-10 $mgl^{-1}$/, or kinetin /2 $mgl^{-1}$/ and IAA /0.5 $mgl^{-1}$/. A high ratio of albinos among regenerants was observed.

IDENTIFICATION OF TWO FIX LOCI CONTROLLING THE EXPRESSION OF nif GENES IN RHIZOBIUM MELILOTI 41

/Zsófia Bánfalvi, V. Petkova, M. Lados, K. Slaska-Kiss, P. Putnoky, C.H. Ung and Á. Kondorosi/

Mol Gen Genet, 215: 345-348, 1989.

Recently, Fix mutants of Rhizobium meliloti 41 defective for

nifHDK transcription in the bacteroid state have been described. Two of these mutants have been used to identify bacterial genes involved in the regulation of nif gene expression. A nifA:lacZ fusion was introduced into the mutant strains and beta-galactosidase activity was assayed in nodule bacteria, as well as bacteria grown under microaerobic conditions. One of the mutants did not express the nifA gene in symbiosis, suggesting that the gene inactivated by mutation fix-24 involved in controlling the expression of the nif structural genes via the regulatory gene nifA. The mutation fix-24 also impaired the expression of nifA under microaerobic conditions. These data are in agreement with earlier findings that low oxygen concentration may serve as a signal for nif gene expression in symbiosis. The fix gene marked by the mutation fix-24 might be a positive regulator of nifA expression in R. meliloti 41. The other mutation /fix-25/ represented another cluster of fix genes which also affected the expression of nifA. This influence, however, was specific for symbiosis. The fix genes /fix-24, fix-25/ were localized on the symbiotic megaplasmid pRme41b. The two genes are 10 kb apart from each other and are located at 200 kb downstream of the nif structural genes in R. meliloti 41.

POSITIVE AND NEGATIVE CONTROL OF NOD GENE EXPRESSION IN RHIZOBIUM MELILOTI IS REQUIRED FOR OPTIMAL NODULATION

/Éva Kondorosi, J. Gyuris, J. Schmidt, M. John, E. Duda, Beate Hoffmann, J. Schell and Á. Kondorosi/

The EMBO Journal, 8: 1331-1340, 1989.

We show that expression of common nodulation genes in Rhizobium meliloti is under positive as well as negative control. A repressor protein was found to be involved in the negative control of nod gene expression. Whereas the activator NodD protein binds to the conserved cis-regulatory element /nod-box/ required for coordinated regulation of nod genes, the repressor binds to the overlapping nodD1 and nodA promoters, at the RNA polymerase binding site. A model depicting the possible interaction of the plant-derived nod gene inducer /luteolin/, the nodD and the repressor with the nod promoter elements is presented. Mutants lacking the repressor exhibited delayed nodulation phenotype, indicating that fine tuning of nod gene expression is required for optimal nodulation of the plant host.

NEW RICE VARIETIES DEVELOPED BY POLLENHAPLOID SOMACLONE METHOD

/L.E. Heszky, I. Simon-Kiss, K. Lőkös, G. Gyulai, E. Kiss and I. Geczki/

Proc. of the 5th Sci. Symp. of Soc. Countries on Biotechnology, Balatonszéplak, 4-8 Sept., 1989. pp. 94-95.

Our postulate was that the phenotypic manifestation of molecular and chromosomal changes /somaclonal variation/ depends on the origin and the ploidy level of the initial explants and primary callus. Consequently the rate of manifestation and in this way the variation of somaclones can be increased by reducing the ploidy level of initial explants.

Pollenhaploid somaclone: Diploid /2n/ plants regenerated from somatic tissue cultures of pollenhaploid plants /n/ of androgenic origin. Variation among pollenhaploid somaclones originated from the genetic instability of cultured haploid somatic cells.

Pollenhaploid somaclone method /PHS-method/

The scheme of the PHS-method consists of the following main steps:

A/ Reduction of ploidy level /androgenesis, gynogenesis/

B/ Maintenance and propagation of somatic tissue on reduced ploidy level

C/ Production of somaclones from somatic tissue of reduced ploidy level
Callus is induced from the somatic tissue of haploid plants /flower, meristem, leaf, etc./ and after several passages diploid plants are regenerated. A part of genetic changes laking place at haploid cell level - also in the case of recessive genes - during rediploidization becomes homozygous and manifests phenotypically in regenerated diploid plants.

D/ Field test of pollenhaploid somaclones.

The PHS-method has been tested /2, 3, 4/ with different genotypes and the results have proved its applicability in rice.

SCREENING FOR PLANT REGENERATION IN CALLUS AND PROTOPLAST CULTURES OF ALFALFA /MEDICAGO SATIVA L./ GERMPLASMS

/L.S. Nam and L.E. Heszky/

Acta Botanica Hungarica, 33:/3-4/ 387-393, 1987. /Published in 1989/

Ovaries, hypocotyls and petioles of 21 germplasm-sources of Medicago sativa L. were used for callus, induction and subsequent evaluation of plant regeneration. Most of the cultivars produced callus as much as 95% over the explants employed. Fifteen cultivars /71%/ showed some degrees

of plant regeneration. The results support the strong dependence of plant regeneration on genotype, explant and subculture. Cultivars with the highest freqeuncy of regeneration were "Szentesi-délibáb" /46.7%/ and "Rambler" /41.7%/. The "Szentesi-délibáb" variety having shown a persistence in its regeneration capacity over three subcultures. Protoplasts isolated from Szentesi-délibáb and Szentesi-821 cultivars were cultured in a liquid medium. Plating efficiency was about 40-50%. Healthy plants were regenerated from the protoplasts of these two cultivars.

ABORTIVE PATHWAYS OF MORPHOGENESIS IN SOYBEAN TISSUE CULTURE

/E. Kiss, L.E. Heszky, G. Gyulai, Zs. Horváth and F. Csillag/

Proc. of the 5th Sic. Symp. of Soc. Countries on Biotechnology, Balatonszéplak, 4-8 Sept. 1989.

On the basis of recent results and our own experiments a conclusion can be drawn that in soybean in the most cases plant cannot be regenerated from the differentiated embryo-like structures and shoot meristems. It was supposed that anatomical investigation of adventitious organs could help in clarifying the causes of unsuccessful plant regeneration.

Light and electronmicroscopic study of the developing embryo-like structures showed that in spite of the morphological similarity they can be considered as neomorphs and not as embryos. They don't have polarity, two meristem-types characteristic for embryo don't develop in them. They rather are similar to leaf-structure then to embryo.

It seems to be an interesting research problem whether the neomorphs can be the results of abnormal embryo development or of misontogenetic way determined genetically and induced in vitro. The adventitious organs developing in the cultures are such shoot tips, whose side meristem is active only. So only leaf primordias start to develop and only leaves are obtained from them.

From anatomical point of view there probably are reasons of the unsuccessfull regeneration experiments where many embryo-like structures or leaves developed but no plant regeneration was achieved.

USE OF PROMOTER-SPECIFIC PROBE TO IDENTIFY TWO LOCI FROM THE RHIZOBIUM MELILOTI NODULATION REGULON

/D. Gerhold, G. Stacey and Á. Kondorosi/

Plant Molecular Biology, 12: 181-188, 1989.

The nodulation regulon of Rhizobium meliloti AK631 includes several operons /nodABC, hsnABC, hsnD, efn locus/ which have in common a consensus promoter sequence called the nod box. A synthetic nod box probe was used to identify two additional nod boxes, n4 and n5, which were subcloned for study. By constructing lac fusions, we show that n4 and n5 sponsor induction of downstream regions as previously shown for nl-nodABC and n2--hsnABC. Using site-directed Th5 mutagenesis, we find that the n5 locus plays a significant role in nodulation of alfalfa and sweetclover, whereas the n4 locus is important for alfalfa, but not for sweetclover. Hybridization data suggest that the n5 locus is conserved among Rhizobium speices. In contrast, the n4 locus seems to be unique to Rhizobium meliloti strains, in agreement with the host-specific phenotype of n4 locus mutants. Thus, the use of a promoter probe allows us to identify nodulation genes which may be overlooked by standard methods such as random Tn5 mutagenesis.

MOLECULAR GENETIC BASIS OF RHIZOBIUM-LEGUME INTERACTIONS

/Á. Kondorosi, Éva Kondorosi, Z. Györgypál, Zsófia Bánfalvi, J. Gyuris, P. Putnoky, E. Grosskopf, M. John, J. Schmidt, D.T. Cam Ha, M. Lados, B. Horváth, K. Slaska-Kiss and J. Schell/

Genome, 31: 350-353, 1989.

Recognition of the appropriate legume and nodule induction are controlled by common /nod/ and host-specific nodulation /hsn/ genes in Rhizobium. The nod and hsn genes are activated by the product of the regulatory nodD in conjunction with specific flavonoids excreted by the plant. Differences in the flavonoid specificity of the NodD proteins occur between different Rhizobium species, or between strains of a given species or even within one strain containing several copies of the nodD gene. Accordingly, the nodD gene controls the host--specific expression of nod and hsn genes. In addition, the nodulation genes are under not only positive but also negative regulation which is mediated by a nod-specific repressor protein. This dual control is required for optimal nodulation of the plant host. Further steps in nodule development are again controlled by

the infecting Rhizobium. It was found that at least four different classes of Rhizobium fix genes are involved directly or indirectly in the expression of late nodulin genes, finally leading to the establishment of nitrogen-fixing symbiosis.

PRODUCTION OF ROOT HAIR DEFORMATION FACTORS BY RHIZOBIUM MELILOTI NODULATION GENES IN ESCHERICHIA COLI: HsnD /NodH/ IS INVOLVED IN THE PLANT HOST-SPECIFIC MODIFICATION OF THE NodABC FACTOR

/Zsófia Bánfalvi and Á. Kondorosi/ Plant Molecular Biology, 13: 1-12, 1989.

The role of the hsnD /nodH/ gene in the determination of the host-specific nodulation ability of Rhizobium meliloti was studied by expressing the common modulation genes /nodABC/ with or without the hsnD gene in Escherichia coli and testing for biological activity on various leguminous plants. In this way, four categories of plants were established. Upon infection with E. coli carrying the nodABC construct, root hair deformation /Had/ was detected on clovers while the hsnD gene was additionally needed for the elicitation of the same response on alfalfa and sweet clover. A weak root hair deformation was seen on siratro by inoculation with E. coli harbouring the nodABC genes and was highly increased when hsnD was also introduced. Cowpea and Desmodium did not respond to any of the E. coli strains constructed. Exudates or cytosolic fractions of the respective E. coli derivatives elicited the same root hair deformation as the intact bacteria. These data indicate that not only the nodABC gene products but also hsnD product are involved in the synthesis of Had factors. Subclones expressing only the nodA,nodB or nodC genes or the same genes in pairs /nodAB, nodBC, nodAC/did not provide a compound with activity comparable to the nodABC factor, suggesting that all three genes are required for the production of the Had factor which is active on clover. Coinoculation of alfalfa plants with two strains of E. coli, one carrying the nodABC genes and the other expressing only hsnD, or combining exudates or cytosolic fractions from these strains did not result in root hair deformation on alfalfa. These data indicate that the HsnD protein itself or its product is not an additional alfalfa-specific extracellular signal but more likely is enzymatically involved in the modification of the basic compound determined by the nodABC genes.

IDENTIFICATION OF A CONSERVED, REITERATED DNA REGION THAT INFLUENCES THE EFFICIENCY OF NODULATION IN STRAIN RS1051 OF RHIZOBIUM LEGUMINOSARUM BV. TRIFOLII

/F. Rodriguez-Quinones, M. Fernández-Burriel, Zsófia Bánfalvi, M. Megias and Á. Kondorosi/

Molecular Plant - Microbe Interactions, 2: 75-83, 1989.

The symbiotic plasmid of strain RS1051 Rhizobium leguminosarum bv. trifolii has been identified by: an indirect approach through isolation of deleted and cured derivatives, mobilization of the plasmid into Agrobacterium, and hybridization with nod and nif gene probes. Two cosmids carrying the RS1051 nod region were selected from a genomic clone bank. Subcloning and deletion analysis indicate that an 11,45-kb DNA region on the symbiotic plasmid carries all the essential genes for red and white clover nodulation in R. l. bv. trifolii and for red clover nodulation in the heterologous strains Agrobacterium and R.l.bv. viceae, whereas an additional 2.55-kb. region has been proven to be necessary for white clover nodulation by those hosts. In addition, a 1.7-kb region located adjacent to the nodFE genes has been found to influence the efficiency of nodulation of both red and white clover.This region is structurally conserved among the rhizobia examined and structurally as well as functionally conserved in R. l. bv. viceae. In R. l. bv. trifolii RS1051 the 1.7-kb nod locus is reiterated on the pSym, and our results indicate that at least two of the copies are functional and necessary for successful nodulation. Furthermore, evidence is presented that strongly indicates that the RS1051 nodD gene is functionally reiterated and works in a host--specific manner.

THE RHIZOBIUM MELILOTI EARLY NODULATION GENES /nodABC/ ARE NITROGEN-REGULATED: ISOLATION OF A MUTANT STRAIN WITH EFFICIENT NODULATION CAPACITY

/Ilona Dusha, Ágnes Bakos, Á. Kondorosi, F.J. de Bruijn and J. Schnell/

Mol Gen Genet, 219: 89-96, 1989.

The presence of combined nitrogen in the soil subpresses the formation of nitrogen-fixing root nodules by Rhizobium. We demonstrate that bacterial genes determining early nodulation functions /nodABC/ as well as the regulatory gene nodD3 are under nitrogen /$NH_4^+$/ control. Our results suggest that the gene product of nodD3 has a role in mediating the ammonia regulation

of early nod genes. The general nitrogen regulatory /ntr/ system as well as a chromosomal locus mutated in Rhizobium meliloti were also found to be involved in the regulation of nod gene expression. A R. meliloti mutant with altered sensitivity to ammonia regulation was isolated, capable of more efficient nodulation of alfalfa than the wild-type strain in the presence of 2 mM ammonium sulfate.

PLANT REGENERATION FROM PROTOPLAST DERIVED CALLI IN RICE /ORYZA SATIVA L./ USING DICAMBA
/B. Jenes and J. Pauk/
Plant Science, 63: 187-198, 1989.

Thirty seven diploid and 7 haploid rice callus cultures were induced from the World Rice Collection maintained in Hungary. Cell suspension cultures were started from these calli in LS-2.5 liquid medium and subsequently transferred into amino acid /AA/ medium. After 1 year of culturing 20 out of the 44 genotypes were found suitable for protoplast isolation. So far protoplast derived calli of genotypes have been obtained by culturing in RY-2 protoplast medium, and protoplast derived green plasts of 3 genotypes have been regenerated through a two-step regeneration procedure. The protoplast derived plants are grown in pots under greenhouse conditions. Experiments are being carried out with the other genotypes developing the plant-protoplast-plant system into a general method which is not dependent on the genotype.

STUDY OF THE EFFLCT OF 2.4-D AND KINETIN ON PLANT REGENERATION IN WHEAT: TWO-STEP EFFICIENT PLANT REGENERATION
/S. Fekete and J. Pauk/
Cereal Research Communications, 17: 3-4, 1989.

Experiment was carried out on testing the effect of various 2.4-D and kinetin combinations on the in vitro plant regeneration capacity of a recalcitrant wheat variety "GK Öthalom". We found that from the dedifferentiated somatic callus culture of the "GK Öthalom" the plant regeneration can be significantly increased by using 2.4-D /1-1.5 mg/l/ and kinetin /0.5-4 mg/l/ hormone combinations in order to induce the formation of embryogenic calli in the first step and subsequently transferring them on a media containing 4 mg/l kinetin in the second step. 85.8% of the calli regenerated plantlets in this way.

GENOTYPE DEPENDENT ADAPTATION OF WHEAT VARIETIES TO WATER STRESS IN VITRO

/G. Galiba, L. Simon-Sarkadi, A. Salgó and G. Kocsy/

Journal of Plant Physiology, 134: 730-735, 1989.

Callus cultures of four varieties of hexaploid wheat /Triticum aestivum L./ were maintained on media containing various concentrations of mannitol. The induced osmotic stress inhibited growth and increased the percent dry matter and the level of free amino acids of the calli. Bigger changes were observed in drought sensitive /"Cappelle Desprez"/ and moderate resistant /"Chinese Spring"/ varieties than in drought resistant ones /"Saberberg" and "Plainsman"/. The putrescine content was highly increased in the drought sensitive variety. The cadaverine level was enhanced during osmotic stress in the drought sensitive and in one of the drought resistant varieties. The extractable protein content was decreased in drought sensitive and in moderate resistant varieties. During osmotic stress the aminopeptidase and carboxipeptidase activity increased significantly in the drought sensitive variety. Endopeptidase activity was low in all samples and no correlation was found between its activity and osmotic stress.

FROST RESISTANCE OF SOMACLONES DERIVED FROM TRITICUM AESTIVUM L. WINTER WHEAT CALLI

/G. Galiba and J. Sutka/

Plant Breeding, 102: 101-104, 1989.

Frost resistance was studied in $SC_4$ seedlings generated by self pollination from 31 /$SC_4$/ plants of 'GK Csongor' winter wheat variety derived from calli. Most of the $SC_4$ families showed less frost resistance than 'GK Csongor'. With respect to percentage survival, one family possessed significantly higher frost resistance as compared to the control at a temperature of $-13^{o}C$. In the case of regrowth analysis, 22 of the 31 families showed less growing capacity and 5 proved to be significantly better than 'GK Csongor'. According to both testing methods, one family showed significantly higher frost resistance than the control.

LIMITED CHLOROPLAST GENE TRANSFER VIA RECOMBINATION OVERCOMES PLASTOME-GENOME INCOMPATIBILITY BETWEEN NICOTIANA TABACUM AND SOLANUM TUBEROSUM

/N.D. Thanh and P. Medgyessy/

Plant Molecular Biology, 12: 87-93, 1989.

Green cybrids with a new nucleus--chloroplast combination cannot be selected after protoplast fu-

sion in the intersubfamilial Nicotiana-Solanum combination. As an approach to overcome the supposed plastome-genome incompatibility, a partial plastome transfer by genetic recombination has been considered. After fusions of protoplasts of a light-sensitive Nicotiana tabacum /tobacco/ plastome mutant and lethally irradiated protoplasts of wild-type Solanum tuberosum /potato/, a single green colony was recovered among 2.5 x $10^4$ colonies. The regenerated plants had tobacco-like /although-abnormal/ morphology, but were normally green, and sensitive to tentoxin, demonstrating chloroplast markers of the potato parent. Restriction enzyme analysis of the chloroplast DNA /cpDNA/ revealed recombinant, nonparental patterns. A comparison with physical maps of the parental cpDNA demonstrated the presence of a considerable part of the potato plastome flanked by tobacco-specific regions.

INDUCTION OF HAPLOID PLANTS FROM WHEAT /TRITICUM AESTIVUM L./ ANTHER CULTURE
/Beáta Barnabás, Éva Szakács, G. Kovács/
Sveriges Utsädesförenings Tidskrift, 99: 125-129, 1989.

Regarding the inheritance of the pollen-callus induction capacity and plant regeneration ability, our data indicate that the inheritance of these features is intermediate. All of the investigated characters at the parental lines used for crosses differed significantly. The reciprocal crosses showed, that there was a strong maternal effect in the inheritance of these characters. Pollen-callus induction and plant regeneration in wheat are of different genetic regulation, consequently these two traits can be jointly improved in a direct genetic way. By crossing two genotypes which transmit different positive androgenic features, the callus induction capacity or the green plant regeneration ability might be combined and introduced in a new synthetic genotype.

EVIDENCE FOR CYTOPLASMIC CONTROL OF IN VITRO MICROSPORE EMBRYOGENESIS IN THE ANTHER CULTURE OF WHEAT /TRITICUM AESTIVUM L./.
/L. Sági and Beáta Barnabás/
Theor. Appl. Genet. 78: 867-872, 1989.

Anthers were cultured from two sets of seven lines of hexaploid wheat /Triticum aestivum L./ with different cytoplasms, the euplas-

mic nucleus donors, 'Siete Cerros 66' and "Penjamo 62', as well as their six alloplasmic lines derived from wild relative species of the genera Triticum and Aegilops. Significant cytoplasmic and nuclear effects but no cytoplasmic-nuclear interaction were found for embryogenic anther response, with the best performance of 'Penjamo 62' in Ae. kotschyi cytoplasm. Plant regeneration was not affected significantly by the cytoplasmic background of the lines cultured.

GENETIC CONTROL OF FROST RESISTANCE IN WHEAT
/J. Sutka/
Sveriges Utsädesförenings Tidskrift, 99: 135-142, 1989.

The cytogenetic study of frost resistance was initiated in callus cultures using Chinese Spring, Cheyenne and six Chinese Spring/Cheyenne substitution lines /5A, 2B, 3B, 5B, 3D, 5D/. Callus cultures were induced from 12-14 days-old immature embryos. After four weeks the calli were subcultured and maintained for an additional four weeks. The calli were cultured at a temperature of 26°C with a 16 h/days illumination of 1500 lux. After a 6-week hardening period, freezing was conducted at different temperatures. Calli were frozen in petri-dishes /10 cm in diameter/. After thawing the viability of the calli was tested using the triphenyltetrazolium chloride /TTC/ method. There was a significant difference between the survival rate of Chinese Spring and Cheyenne. At the temperature of -11°C the viability of Chinese Spring calli rapidly decreased from 100% to 25%. At -13°C only a few cells or cell aggregates survived. On the other hand, Cheyenne calli tolerated both the -11°C and -13°C treatments giving 75% survival rates, but -15°C was lethal to it. The frost resistance of two substitution lines, 5A and 5D, was significantly different from that of Chinese Spring at both -11°C and -13°C. Similar result to that was obtained with Cheyenne. The other examined substitution lines, 2B, 3B, 5B and 3D, were found as sensitive as the Chinese Spring.

ELECTROFUSION OF FERN PROTOPLASTS BY ALFA-200 FUSION GENERATOR
/Ágnes Breznovits, A. Major, E. Sheffield, G. Vida/

Gametophytes of different fern species: Pteridium aquilinum L., Pteris cretica cv. albolineata, Pteris henryi and Pteris vittata were cultured according to Attree and Sheffield /1984/. Proto-

plasts were isolated using the modified method of Attree and Sheffield /1985/ and purified by Ficoll density gradient centrifugation /Attree and Sheffield 1986/. Protoplast viability was estimated using FDA staining /Widholm 1972/, cell wall regeneration by CW staining /Nagata and Takebe 1970/ and SEM /Attree and Sheffield 1984/. Protoplasts were regenerated on filter paper or in agarose. Electrofusion was achieved using ALFA-200 fusion generator according to Kohn et al. /1985/. Identification of parental and hybrid lines is in progress using SDS PAGE analysis of total proteins by the method of Spencer et al. /1980/ modified by Major.

Isolation and regeneration of protoplasts was successful from all used species. Electrically induced fusion has been performed in frame chamber using ALFA-200 fusion generator. Optimal conditions were found to be: density: $10^4$ protoplasts/ml; AC field: 3 to 5 V; frequency: 500 to 1000 kHz; DC pulses: of 30 V /1 to 3/ and 50 µsec duration and 0.1 sec gap. Somatic hybrids were obtained between all used species but could be regenerated only in some cases up to 8 to 16 cellular state. Parental lines regenerated normal gametophytes. Streptomycin resistant Ptericium lines /PSr 1, 2, 3/ were also fused with sensitive control and with each other. In these cases regeneration occured and their identification is in progress by analysis of total protein patterns.

BREEDING ON A CELLULAR LEVEL, AND RESEARCH ON $F_1$ HYBRID DEVELOPMENT

/Z. Barabás, Z. Kertész, L. Purnahauser, F. Sági and J. Pauk/

In: Maluszynski, M. /ed/: Current Options for Cereal Improvement, 11-18, 1989., Kluwer Academic Publ.

In different somatic cultures initiated from immature embryos or young inflorescences the genotype-dependence for callus induction was almost completely eliminated, though some exceptions were observed. Plant regeneration from any wheat genotype was also achieved.

Haploid cell cultures were established and will be produced from these suspension cultures in the near future. Protoplast isolation from a suspension culture was also successful, but plant regeneration was not obtained so far.

Barley x wheat intergeneric hybrids were produced and from these 22 somaclones were regenerated. Significant morphological differences, such as reduced

height and lodging resistance appeared among the BC progenies. Streptomycin resistant potential mutants were isolated from somatic cultures using a special selection system. The test of the putative mutants is under way. An essentially new, patented technology was worked out for $F_1$ hybrid seed production in blendings. It also works well in cases of partial male or self-sterility. This system works on cms, gms, si and cha male sterile systems.

BREEDING AND BIOTECHNOLOGY IN THE CEREAL RESEARCH INSTITUTE, SZEGED, HUNGARY, 1983-1988
/Z. Barabás/
Sveriges Utsadesförenings Tidskrift, 99: 87-91, 1989.

Headlines of the publication:

1 Conventional research work
2 Somaclone lines from wheat
3 Gametoclones from wheat and corn
4 Genetic purification by anther culture
5 Protoclones from rice
6 Transgenic form
7 A new hybrid seed production method
8 Stimulation of shoot regeneration using silver nitrate

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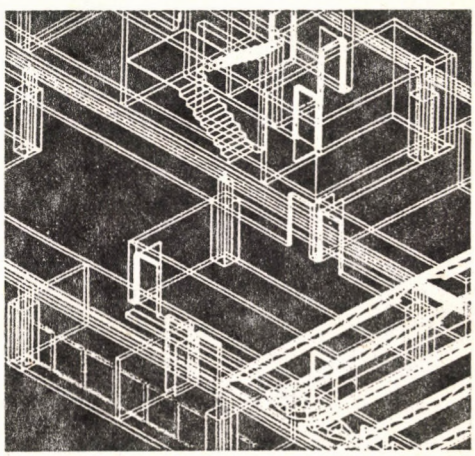

# ANIMAL BREEDING

BACTERIAL, CONTAMINATION OF UTERUS AND ITS EFFECT ON THE REFERTILIZATION IN DAIRY COWS

/T. Takács, I. Gáthy, E. Bajmóczy, M. Ramocsa, L. Magyari and Gy. Tury/

Magyar Állatorvosok Lapja, 44: /6/ 335-341, 1989.

Bacteriological investigation of uterus was carried out on 14 dairy farms, in case of 150 dairy cows during the involution, first between the 10th and 20th days postpartum and then twice with two weeks intervals. Grade of bacterial contamination was determined at different points of time and in vitro resistance of isolated bacteria was studied. Correlation between reproductive biological indices of investigated animals and bacterial contamination of uterus, as well as certain environmental and genetic factors was analysed.

At the end of the involution, uterus, showed a moderate or more severe contamination on 35.7% of farms in more than 30% of investigated animals. Streptococci, E. coli and corynebacteria were isolated in the majority of cases. The isolates showed an expressed antibiotic resistance. Both the farms and different groups showed significant differences in the length of time from calving to the first service, as well as to the fertilization. A close correlation was found between these differences and the bacterial contamination of uterus at the end of involution. The worst reproductive parameters were found in the case of uterinal contamination due to corynebacteria.

The rate of infected uteri was higher than the average after the third calving, as well as in individuals with a laction peak lower than 20 l. No correlation was found between the bacterial state of uterus and breed, keeping conditions, season of calving /automnal, as well as winter-early vernal/.

Periodic investigations of a representative part of stocks in-

dicate the grade of contamination and progress of clear-up of uterus on the dairies and give information on the appropriate prevention and make possible the special purpose antibacterial therapy of metritis.

BACTERIOLOGICAL INVESTIGATION OF UTERINE FLORA

/T. Takács, M. Ramocsa and E. Bajmóczy/

Magyar Állatorvosok Lapja, 43: /7/ 403-406, 1989.

A simple swabbing device was constructed to collect specimens for bacteriological investigation from the uterus of cattle and swine. The device proved to be suitable for the safe collection of specimens in a large number under practical conditions. The collection of specimens can easily be carried out by the manuality of experts experienced in the artificial insemination. It has been found that repeated samplings do not result in complications, conceptional rate of sampled animals was not inferior to that of controls. Aerobic and anaerobic cultural tests were performed with the swabs. Besides the identification of bacterium strains causing uterine infection, the grade of infection was also evaluated empirically and the antibiotic and chemotherapeutic sensitivity of the major strains was determined. The results obtained on a stock level were used as indicators for the interaction between hygienic conditions associated with the uterine infection, and factors resulting in the bacteriological clearing up /individual defense mechanisms, competence and indications of the therapy/. Sensitivity testing makes feasible the special purpose therapy and avoids the needless use of antibiotics and thus, it diminishes the chance of residuum-formation.

DEEP-FREEZING OF BOAR SEMEN BY THE METHOD OF BELTSVILLE AND RESULTS OF INSEMINATIONS USING DEEP-FROZEN SEMEN

/T. Takács, Z. Macháty, J. Magyar, S. Papp, Z. Krasznai, A. Vántus and S. Damjanovich/

Magyar Állatorvosok Lapja, 44: /8/ 469-473, 1989.

Ejaculates of 10 boars were deep-frozen by the method of Beltsville /Pursel-Johnosn, 1975/ in form of pellets. As an average, 16 deep-frozen doses were prepared per boar with an average sperm cell count of $7.5 \times 10^9$. Microscopic examinations of thawed semen showed that the percentage of spermatozoa with progressive mobility varied between 10 and

50%. Doses showing values higher than 20% were used for insemination. In three groups, 101 sows were inseminated with deep-frozen semen 24 hours after observing the immobile response to manual pressure and 8 hours thereafter. In a proportion of animals /50 sows/, the first dose of insemination was supplemented by 5 mg of $PGF_{2alfa}$.

As an average, 30% of sows became pregnant as compared to the 66% fertility in controls inseminated with fresh semen. Efficacy of insemination was independent of the quality of semen observed before and after freezing /of the rate of motile spermatozoa/, of the sperm cell counts of doses and of the period of insemination /December, January, April/. $PGF_{2alfa}$ supplementation did not improve the fertilizing capacity in the applied form, however it decreased significantly the litter size. Litter size of sows inseminated with frozen semen without $PGF_{2alfa}$ treatment was comparable with that of controls.

IN VITRO FERTILIZATION OF BOVINE OVA

/K. Schellander, Erika Schellander, E. Führer, Christina Hauser, W. Schleger, J. Seregi, J. Péli, Á. Treuer, L. Solti, J. Haraszti, F. Szász, B. Bényei and M. Török/

After preliminary experiments carried out in sheep /1986/, the first series of experiments have been reported on the in vitro fertilization /IVF/ of a large number of bovine ova. Of 214 ovaria, collected on slaughterhouses, 421 ova were isolated. After the maturation in a growth medium and in vitro fertilization /using deep-frozen sperm cells, capacitated according to the method reported by Parrish et al. 1986/, 271 /64.4%/zygotes were transferred onto the oviduct of sheep. After a 96 hours in vivo cultivation, 52 /19.2%/ formations were recovered. Of them 18 /34.6%/ embryos proved to be suitable for transfer onto bovine recipients. Of them, 5 embryos were transferred /1x3 and 1x2, onto the uterine horns corresponding to the corpus luteum/ onto heifers, synchronized by prostaglandin, according to the non-surgical method known from the literature. Although one of the recipients failed to show estrus and her serum progesterone level was also high on the 14th day, the procedure did not results in pregnancy.

EMBRYO TRANSFER AS A POSSIBILITY FOR THE ERADICATION OF AUJESZKY'S DISEASE IN SWINE

/J. Haraszti, I. Medveczky, G. Rónai, J. Seregi, L. Solti and J. Varga/

Magyar Állatorvosok Lapja, 44:6, 325-327 /1989/

The role of Aujeszky's disease virus infected embryos was investigated in the transmission of the infection. During the first experiment, donor sows were infected by a dose of $3x10^7$ $TCID_{50}$ of Aujeszky's disease virus by intranasal and intravaginal routes at the time of insemination. During the second of experiments, 6 gilts were infected at the beginning and parallel with the hormone treatments. The third series of experiments were carried out under field conditions on a state farm. The experiencies obtained during the experiments have shown that the transmission of embryos, originating from experimentally infected donors, can be transferred without any risk of the transmission of infection even then when recovery of zygotes was carried out from the donors during the state of acute varaemia, 0.25% trypsin treatment of zygotes recovered from infected uterinal environment and a subsequent washing procedure in Dulbecco's solution prevented the transmission of infection. This was also confirmed by the lack of seroconversion in recipient sows tested within 50 days after embryo transfer, as well as in newborn pigs. In the course of the field experiment, all the five recipient sows also remained seronegative during the repeated serological examinations carried out within 50 days after embryo transfer.

DEEP-PREEZING OF BOVINE EMBRYOS

/S. Cseh/

Magyar Állatorvosok Lapja, 44:/6/ 329-334, 1989.

Results and experiences obtained with a simplified embryo deep freezing technology have been reported.

Recovery of embryos was tried on the 6th-7th-8th days of the cycle /the first insemination was made in the evening of the second day, in the 42nd to 48th hours after the administration of prostaglandin = day 0/. Selected embryos were qualified /A, B, C and 1/ and those of group "A" and "B" were frozen. During the preparation of embryos for deep freezing, methods ensuring the maximal glycerine concentration /10%/ stepwise or by a single step were compared each other. Seven-day old embryos showing the best survival rates were deep frozen by 4 different freezing

technology. For the elimination of cryoprotective agent, three procedures were comparatively studied /in 6 steps, using a glycerine solution, in 2 steps with 0.25 M saccharose-glycerine solution and in a single step, using an 0.25 M saccharose solution/.

Data of the experiment showed that embryos of "A" quality, recovered on the 7th day, being in the stages of late morula /compact morula/, early blastocyste or blastocyste showed the best survival rates /$P < 0.001$/. Six and seven days old embryos of "B" quality had a significantly lower survival rate after freezing than those of "A" quality, recovered on the same day /$P < 0.001$/.

Independently of the method of glycerine dosage, the survival rates of good quality embryos were significantly higher /$P < 0.001$/ after freezing. In case of "B" quality embryos, the survival rates were lower by 10% when they were directly taken into a medium with the maximal glycerine concentration. Significant differences were found in the survival rates neither in 6-day old nor in 7-day old embryos when different methods were used for the elimination of glycerine. Significant differences were found between the survival rates of one-step group /23%/ and two-step group of 7 days old medium quality embryos /51.4%, $P < 0.05$/. No differences were found in the efficacy of freezing methods studied. Evaluating the data in 7 days old embryos of "A" quality, it was found that the 166 min freezing time can effectively be diminished to 63 min.

FIRST RESULTS OF DNA WORKS IN THE RESEARCH CENTRE FOR ANIMAL PRODUCTION

/T. Gere, F. Takács, K. Burg, I. Raskó, G. Veres/

Állattenyésztés és Takarmányozás, 38: 2, 107-112 /1989/

First experiments in order to establish DNA works in Hungary started in 1986 in the Research Centre of Animal Production and in the Szeged Biological Centre of the Hungarian Academy of Science.

In these experiments first a bovine hypophyseal cDNA clone bank was established. On basis of preliminary experiments lambda gt 11 bacteriophage has been chosen as cloning vector. At first the EcoR1 linked double stranded cDNA was ligated into the phage that had been digested by the EcoR1 restriction enzyme then after in vitro packing the clone bank was grown on E. coli Y 1088 strain. The experiment yielded $1.2 \times 10^6$ recombinant phage clone/ /µg cDNA.

The cDNA section that code the growth hormone was isolated from approximately $5x10^4$ recombinant clone by using a heterolog cDNA kindly provided by Dr. H.M. Goodman /USA/. The length of the bovine cDNA in the isolated clone was 786 bp and as judged from the physical map and from the results of the sequence analysis it contained the full sequence of protein coding and also non-translating sequences of 56 and 104 bp on the 5' and 3' end, respectively.
The isolated sector was cloned in the lambda gt 11 phage. This is considered significant step toward production of a fusion "gene" which might be suitable for starting experiments that aim at transforming of embryos in the early phase of the ontogeny.

MOLECULAR CLONING OF DNA FROM A BOVINE HERPESVIRUS 1 STRAIN ISOLATED IN HUNGARY
/Györgyi Bárány, B. Harrach, Mária Benkő and A. Bartha/
Acta Veterinaria Hungarica, 37: /4/ 353-360, 1989.

Molecular cloning of the HindIII fragments of bovine herpesvirus 1 /BHV-1/ strain HB144, isolated from infectious bovine rhinotracheitis /IBR/ in Hungary, and of an infectious postular vulvovaginitis /IPV/ reference strain /K22/ is reported. So far 52% of the IBR viral genome and 28% of the IPV viral genome have been cloned. The analysis of differences between the strains is currently in progress.

EXPERIMENTALLY PRODUCED MONOZYGOTIC CATTLE TWINS: HIGH DEGREE OF SIMILARITY OF THEIR NOR-EXPRESSION PATTERN
/B. Mayr, F. Führer, K. Schellander and J. Seregi/
Wiener Tierärztliche Monatschrift, 76: 295-299, 1989.

Four experimentally produced Holstein-Friesian cattle twins were investigated for their NOR /nucleolus organizer/ patterns. The intrapair similarities implied that the variation of NOR expression was predominantly genetically determined.

# ECOLOGY

BIOREACTOR ARRANGEMENTS IN WASTEWATER TREATMENT
/Andrea Jobbágy and L. Nyeste/
Folia Biotechnologica, 34: 1-47, 1989.

During biological wastewater treatment - in most cases - the elimination of a great number of different properties is carried out by a heterogenous microflora. Thus, the conditions provided for the biodegradation have a selecting effect on the most corresponding microorganisms and processes. The study concerns the theoretical basics of the influence of reactor arrangement and wastewater quality on the effluent quality. The practical solutions have also been considered from this point of view.

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In order to satisfy local needs faster, we operate translating offices also in 8 provincial cities.

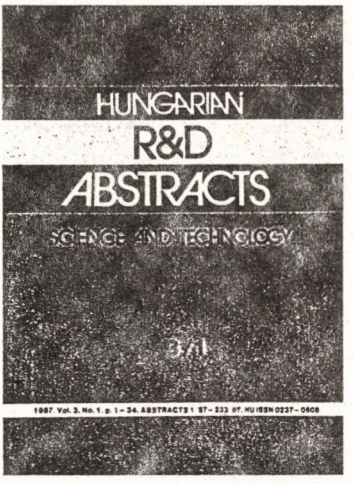
The database files of OMIKK deserve a separate treatment:

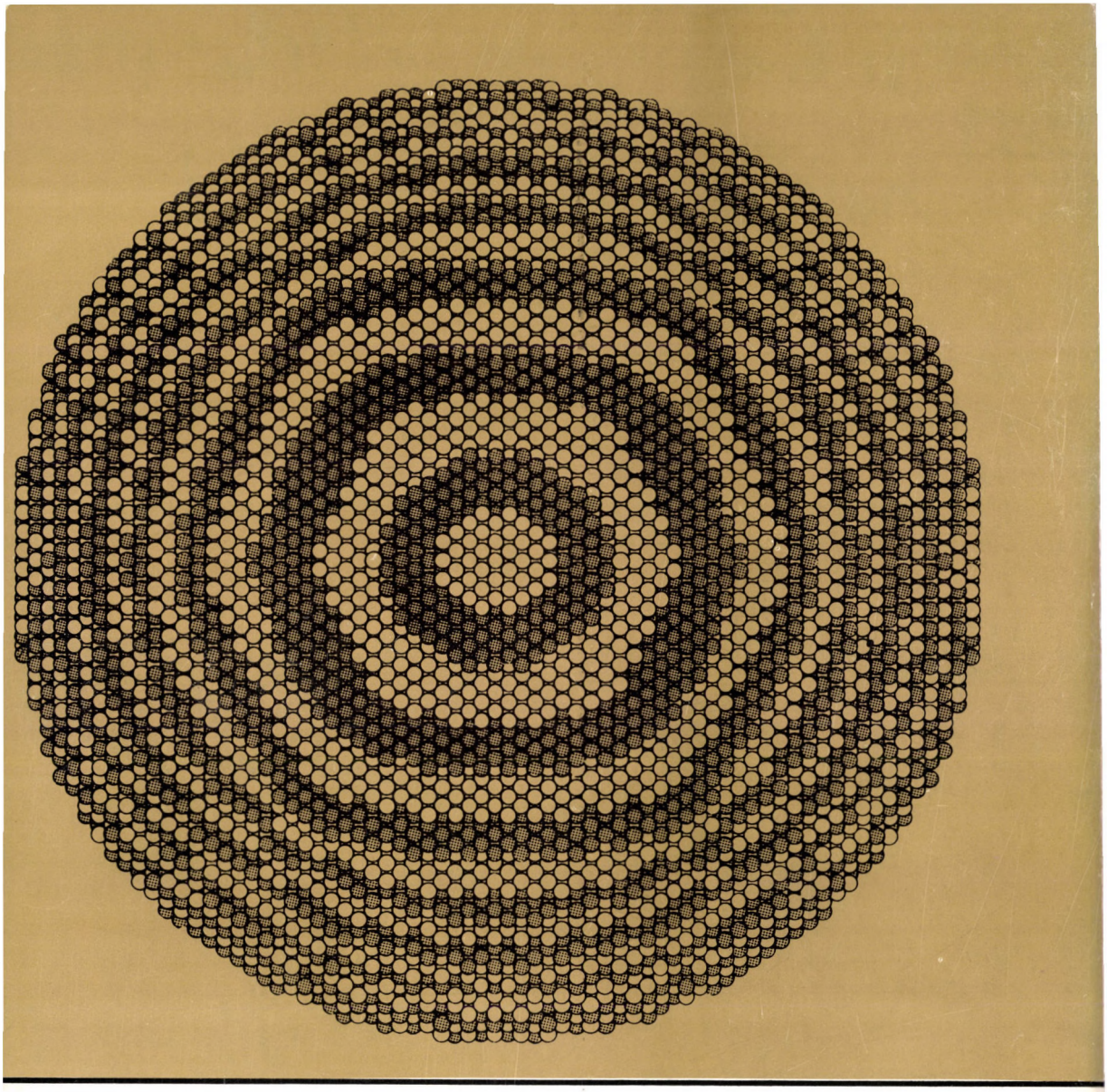
- NATIONAL FILE OF TRANSLATIONS (OFNY) AND THE COLLECTION OF DEPOSIT COPIES OF TRANSLATIONS
- NATIONAL FILE ON HUNGARIAN R+D PROJECTS (KUFET): This computer-based data file contains 38 000 records at present, and 5–8000 are added a year.
- DATA FILE ON HUNGARIAN LICENCE TRADE (LTIR): A union file on the Hungarian import and export of licences as well as on their use. Contains over 7000 items and about 1000 items are added a year.

The permanent staff of OMIKK is made up of about 500 highly qualified professionals. As well as, about 3000 outside specialists work regularly for the institute. Most of them are researchers, development engineers with extensive knowledge of foreign languages.

This staff uses up-to-date information technology and currently develops its information processing methods for the effective and continuous provision of professional information for Hungarian engineers, researchers and managers.

In this activity we do not limit ourselves to the holdings of our own library, not even to resources held elsewhere in Hungary.





ORSZÁGOS MŰSZAKI FEJLESZTÉSI BIZOTTSÁG

FEHÉRJE- ÉS BIOTECHNOLÓGIAI IRODA