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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO)
INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

FAO/IAEA International Symposium on Applications of Gene Based Technologies for Improving Animal Production and Health in Developing Countries

6–10 October 2003
Vienna International Centre
Vienna, Austria

ANNOUNCEMENT

AND

CALL FOR PAPERS

1. INTRODUCTION

Genetic engineering is at the forefront of much biological research — basic, adaptive and applied or near market. Manipulation of genes to bring about the expression of a specific product, or to produce a characteristic or trait, offers exciting possibilities within both the plant and the animal kingdom. The opportunities, in terms of improving livestock productivity or reducing losses from disease, lie in a number of areas. Some examples are:

- The expression of gene products that can be used as vaccines or reagents in diagnostic assays. Recombinant vaccines and vector virus expressed diagnostic reagents are being increasingly used and offer a variety of advantages, including their purity, safety and cost.
- Molecular techniques used in epidemiology to make possible the characterization of pathogens (viruses, bacteria, parasites) through determination of their nucleotide sequence. This is particularly important for epidemic diseases, where the possibility of pinpointing the source of infection can significantly contribute to improved disease control.
- The production of therapeutic substances through the insertion of specific genes into a variety of living tissues, ranging from single cells to complete animals or plants. There are already successes in this area and the potential is considerable.
- The identification of genes (usually several genes) that control an advantageous genetic productivity trait. Analysis and identification of individuals or specific breeds that have this gene cluster is then possible, allowing breeding from these for subsequent improvement in production. A more long term goal in this area would be to insert such advantageous genes into particular breeds or species to perpetuate a trait through genetic modification.
- There are many initiatives to obtain the complete genome sequence for many organisms, including humans. Although all cells contain the complete genome of any given organism, not all genes are expressed within each cell type. Therefore, it is imperative to study the expression of the genes and post-translational modification of proteins coded by genes through transcriptome analysis and proteomics. In the context of developing countries, one approach could be control of the expression of genes that confer disease resistance or a specific productivity trait, through simple approaches such as nutrition or environmental triggers.
- Production of transgenic animals with defined traits and utilization of cloning procedures as a tool for identical multiplication of valuable animals.
- The majority of domestic animal breeds are in developing countries, and global surveys indicate that about 30% of all livestock breeds are at risk of extinction, with little investment in conservation efforts. The use of microsatellites in genetic distancing of breeds will help maintain breeds through the conservation of genomic DNA, along with other approaches.
- Plant biotechnologies to improve the nutritional quality of plant feedstuffs and by-products offer enormous potential benefits for the livestock industry. Tremendous strides have been made in the recent past. Genetically engineering rice to produce high levels of beta carotene and iron is close to realization, and this has vast implications in developing countries. The work has demonstrated that it is possible not only to transfer a single gene but also the entire genetic pathway for producing a nutritionally advantageous substance in a plant. There are examples where the composition of oils, proteins and carbohydrate in seeds of corn, soybean and other crops has been modified using plant breeding and molecular technologies to produce grains with enhanced value. Improving feed quality through genetic manipulation holds great

promise, e.g. through alteration of the leaf/stem ratio; introduction of 'stay green' traits; increasing the digestibility of nutrients, especially the fibre in tropical forages; decreasing the fibre content and increasing cell solubles; increasing soluble carbohydrate in roughages; increasing protein in tropical forages and decreasing the degradability of proteins in the rumen for temperate forages; increasing sulphur amino acids in leguminous forage; regulation of protein and carbohydrate contents and their degradation to achieve maximum microbial protein synthesis in the rumen, etc.

- There are good prospects for manipulating rumen microflora to enable better utilization of feeds in ruminant species through the degradation of fibre and lignin, increasing the efficiency of nitrogen utilization and allowing the breakdown of anti-nutritional and toxic factors. The establishment of genetically modified microorganisms or 'foreign microbes' in the rumen can be monitored using competitive PCR methods and 16S rRNA-targeted oligonucleotide probes, which do not require culturing of microbes. These probes can also be used to allow characterization of rumen ecology, and such information can be used to develop more appropriate feeding strategies and also to allow a reduction in the emission of environmentally polluting gases, in particular methane.

In almost all areas of this research, isotopic markers are extensively used and are in most cases essential for achieving the levels of sensitivity required for genetic characterization and manipulation. Genetic engineering has the potential to solve many problems relating to animal productivity and health. At present the focus is on the problems that face livestock producers in the developed world. If the full benefit of this technology is to be realized globally, the problems confronting livestock farmers in developing countries will have to be considered. The characterization and application of methods in these regions has to be managed and exploited. It is hoped that this Symposium will stimulate the international exchange of information and ideas that contribute to greater accessibility and enhanced use of gene based technologies in animal agriculture in developing countries.

2. OBJECTIVES

- To create an interactive environment to discuss the role and future potential of gene based technologies for improving animal production and health;
- To identify constraints in the use of gene based technologies in developing countries and to determine how to use these technologies in a simple, practical way;
- To identify and prioritize specific research needs;
- To explore the possibility of international co-ordination in the area of gene based technologies in animal agriculture;
- To examine ethical, technological, policy and environmental issues and the role of nuclear techniques in the further development and application of gene based technologies with respect to livestock; and
- To develop a plan to translate the Symposium recommendations into actions.

3. TARGET AUDIENCE

- Scientists from developing and developed countries
- Policy makers — governmental and international organizations
- Donor agencies — international/national organizations, international/national foundations and

trusts

4. PROGRAMME STRUCTURE

- Plenary Lectures
- Theme Specific Sessions: keynote addresses, contributed papers and posters
- Panel Discussions/Discussion Forum

Plenary Lectures (on the first day)

- A vision of gene based technologies for the livestock industry in the third millennium
- Advances in, and impact and future of, gene based technologies in developed and developing countries: A comparative scenario and efforts required to bridge the gap.

These lectures will set the scene for the Symposium.

Theme Specific Sessions

The format will be: 3–4 keynote addresses by invited speakers (30 min presentation followed by 10 min discussion); 4–6 oral communications (10 min presentation followed by 5 min discussion); and posters, for each of the following four sessions:

1. **Gene based technologies applied to livestock**
   Chairperson: John Gibson, Kenya
2. **Gene based technologies applied to pathogens and host–pathogen interactions**
   Chairperson: Paul-Pierre Pastoret, United Kingdom
3. **Gene based technologies applied to plants, rumen microbes and systems biology**
   Chairperson: C.S. McSweeney, Australia
4. **Gene based technologies in relation to the environment, food safety and the livestock industry, and related ethical and intellectual property rights issues**
   Chairperson: John Hodges, Austria

Prominent experts will be invited to deliver keynote addresses to provide perspectives, give rationales and expound on the potential applications of and need for innovation in gene based technologies in the context of developing countries. There will be no parallel sessions. Ample time will be provided for questions and answers, with opportunities for personal interactions with the speakers.

Panel Discussions

The first two Panel Discussions will each be of two hours' duration. They will start with brief statements of 10 min each by 4–6 invited speakers, followed by questions from the floor, replies by the invited speakers, comments and discussion, and finally conclusions by the moderator. The moderator is expected to submit a report on the Conclusions and Recommendations for discussion during the third Panel Discussion.

Panel Discussion 1: Which gene based technologies are most likely to succeed in enhancing animal productivity in developing countries?

Panel Discussion 2: Role of international organizations and funding agencies in promoting gene based technologies in developing countries.

Panel Discussion 3: Where to go from here — How can the recommendations of this Symposium be translated into action?

The Symposium will conclude with this Panel Discussion, which will be held on Friday 10 October and will be of three hours' duration. Chairpersons of the Sessions and moderators of the previous two Panel Discussions will present Conclusions and Recommendations of their respective Sessions/Panel Discussions, followed by a discussion of 60–90 minutes' duration.

5. CONTRIBUTED PAPERS

Concise papers on issues falling within the topics outlined in Theme Specific Sessions (Section 4 above) may be submitted as contributions to the Symposium. All papers, apart from invited review papers, must present original work; they should not have been published elsewhere. All accepted papers will be published in the Symposium proceedings and will be considered by the Chairpersons in Panel Discussion 3.

In order to provide ample time for discussion, the number of papers that can be accepted for oral presentation is limited. If the number of relevant and high quality papers submitted for selection exceeds the acceptable number, poster sessions may be arranged. The authors may indicate if they would wish to present their contribution as an oral presentation or a poster. The sponsoring organizations reserve the right to refuse the presentation or publication of any paper that does not meet the expectations based on the information given in the extended synopsis.

(a) Submission of extended synopses

Persons who wish to present a paper or poster at the Symposium must submit an extended synopsis (in English) together with the completed Form for Submission of a Paper **(Form B)** and the Participation Form **(Form A)** to the competent national authority for official transmission to the IAEA in time for them to be received by the IAEA by **10 April 2003**. In addition, the synopsis should be sent electronically to the IAEA Scientific Secretary, Mr. H. Makkar, e-mail: H.Makkar@iaea.org. Authors are urged to make use of the Extended Synopsis Template in Word 2000 on the Symposium web page. The specifications and instructions for preparing the synopsis and using the synopsis template are given in the attached "Instructions on how to prepare the extended synopsis and how to submit it electronically". Attached to this announcement is a sample extended synopsis.

The synopsis will be considered by the Programme Committee only if the Participation Form A and Paper Submission Form B have been received by the IAEA through the official governmental channels.

(b) Acceptance of papers

Authors will be informed of whether their paper has been accepted by the Programme Committee on the basis of the extended synopsis submitted. At the same time, authors of accepted papers will be advised if the synopsis has been accepted for oral presentation or for presentation as a poster, and they will also be informed of the assigned paper number and session of presentation. The accepted synopses will be reproduced in unedited form in the Book of Extended Synopses.

6. PARTICIPATION

All persons wishing to participate in the Symposium are requested to complete a Participation Form (see attached Form A) and send it as soon as possible to the competent official authority (Ministry of Foreign Affairs, Ministry of Agriculture, national FAO committee, or national atomic energy authority) for subsequent transmission to the IAEA. A participant will be accepted only if the Participation Form is transmitted through the government of a Member State of the sponsoring organizations or by an organization invited to participate.

Participants whose official designations have been received by the IAEA will receive further information on the Symposium approximately two to three months before the meeting. This information will also be posted on the web page: http://www.iaea.org/worldatom/Meetings/ .

7. EXPENDITURES

No registration fee is charged to participants.

As a general rule, the IAEA does not pay the cost of attendance, i.e. travel and living expenses, of participants. However, limited funds are available to help meet the cost of attendance of selected specialists mainly from developing countries with low economic resources. Generally, not more than one grant will be awarded to any one country.

If governments wish to apply for a grant on behalf of one of their specialists, they should address specific requests to the IAEA Secretariat to this effect. Governments should ensure that applications for grants:

(a) are submitted by **10 April 2003,** and

(b) are accompanied by a duly completed and signed Grant Application Form (see attached Form C).

Applications that do not comply with conditions (a) and (b) cannot be considered.

The grants awarded will be in the form of lump sums that usually cover only part of the cost of attendance.

8. PROCEEDINGS

It is intended that the proceedings of the Symposium will be published as a book by an external publisher and that all participants will receive a free copy of the proceedings.

9. EXHIBITION

A limited amount of space will be available for commercial vendors' displays/exhibits during the Symposium. Interested parties should contact the Scientific Secretary.

10. WORKING LANGUAGE

The working language of the Symposium will be English. All communications, synopses and papers must be sent to the Symposium Secretariat in English.

11. DOCUMENTS AND WEB SITE

Information on the Symposium as it becomes available will be placed on two IAEA web sites:

http://www-pub.iaea.org/MTCD/Meetings/Announcements.asp?ConfID=110
http://www.iaea.org/programmes/nafa/d3/index-symp2003.html

A preliminary programme of the Symposium will be sent to participants before the meeting. It will also be available on the above mentioned web sites.

The final programme and Book of Extended Synopses will be distributed at registration.

12. ACCOMMODATION

A wide range of accommodation will be available. Hotel room rates range from approximately US $40 to 250 per night (with breakfast), while room rates in apartments range from approximately US $30 to 65 per night. Detailed information on accommodation and other items will be sent directly to all designated participants well in advance of the meeting.

13. VISA

If you require a visa to enter Austria (the 'Schengen visa'), please submit the necessary applications to the nearest diplomatic or consular representative of Austria as early as possible (please note that this procedure may take up to three weeks).

14. SECRETARIAT

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The Scientific Secretary for the Symposium is Mr. Harinder Makkar (telephone extension 26057; e-mail address: h.makkar@iaea.org) of the Animal Production and Health Section, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. Communications related to technical aspects of the Symposium should be addressed to Mr. Makkar. Meeting organization is

provided by Ms. Karen Morrison, Conference Service Section, Division of Conference and Document Services (telephone extensions 21317 and 21311, e-mail address: k.morrison@iaea.org).

15. CHANNELS OF COMMUNICATION

The Participation Form and the Form for Submission of a Paper, together with two copies of each synopsis, and, if applicable, the Grant Application Form, should be sent to the competent official authority (Ministry of Foreign Affairs, Ministry of Agriculture, national FAO committee, or national atomic energy authority) for transmission to the IAEA.

Subsequent correspondence on scientific matters should be sent to the Scientific Secretary (Mr. H. Makkar) and correspondence on administrative matters to the IAEA Conference Service Section (Ms. K. Morrison).