

NEWS BULLETIN

UNIVERSITY OF GUELPH

Vol. 19 No. 34

August 21, 1975

Freezing techniques developed to store embryos from cows

What artificial insemination in cattle breeding did for male reproductive potential in the fifties, embryo transplantation may do for female reproductive potential in the seventies.

Unquestionably A.I. (artificial insemination) increased many times the reproductive capacity of genetically superior bulls. With A.I. a bull can sire scores of thousands of offspring over a period of years (a calf recently born at the University of Guelph was the product of semen frozen in 1954). The success of A.I. has overshadowed the lack of progress with the female half of the reproductive mechanism. A cow is limited to producing one calf a year, for a lifetime yield of ten offspring.

Two reproductive physiologists in the Department of Animal and Poultry Science at the University of Guelph have developed embryo freezing techniques which may contribute to a major breakthrough in female reproductive capacity.

Professor J.W. Macpherson and Dr. Paul Fiser have been exploring reproductive control in domestic animals, funded by a National Research Council fellowship and the Ontario Ministry of Agriculture and Food. They have focused their research on gametes (the sperm and ovum) and on the embryo (fertilized ovum) at the very early stages of development.

Professor Macpherson envisions a time

in the not-so-distant future when fertilized embryos could be removed from a cow, frozen until host cows are available, recultured and implanted into the host cows. Genetically superior animals would supply the eggs; mediocre cows would act as living incubators for the embryos. These techniques would enable a cow to provide the ova for 80 or more offspring during her lifetime.

Pilot studies performed on mice have proven so successful that the next phase of research will deal directly with bovine ova. Dr. Fiser has developed a technique of freezing mice embryos and reculturing them with about an 80 per cent survival rate. Mice were selected for the initial work because they're small and inexpensive and produce many ova. A prepuberal female mouse treated with hormones can produce up to 90 ova at one time. These ova are fertilized to produce embryos which are surgically removed. In contrast, a cow treated with hormones will superovulate, producing about 10 ova.

The reproductive capacity of any female animal could be dramatically increased with a technique called cloning, but several major hurdles must be overcome before it is implemented. Dr. Fiser explained that cloning technique requires separation of the bovine embryo at the eight-cell stage into a clone of eight entities. Each will grow and develop



Dr. Paul Fiser surgically implants embryos into the host mouse.

into a complete animal. With a micromanipulator, Dr. Fiser has successfully separated the cells, but they do not develop as predicted. He hopes to develop the cloning technique so it could be used, in conjunction with other techniques, to increase the yield of offspring from one genetically superior cow to over 600.

Besides the obvious economic benefits to farmers, research in reproductive physiology will lead to a better understanding of reproduction in all animals, including man.

The freezing process developed by Dr. Fiser involves placing the embryos in a cryoprotective solution which dehydrates the embryos as the temperature is lowered to minus 198° Celsius. Success depends on the composition of the solution and the rate of freezing. After being stored for a period of time at the low temperature, the embryos can be recultured and will start to grow normally. At this point they can be implanted into a host where they develop normally into mouse fetuses. Currently Dr. Fiser surgically implants the embryos into the host female.

"Similar techniques could apply to bovine embryos," said Dr. Macpherson, "with slight changes in the composition of the solution and freezing rates." He and Dr. Fiser will also start developing non-surgical implantation techniques for cows.

Bovine embryo transplants are actually being used in some commercial operations, in spite of several major drawbacks. The embryos must be removed surgically, an expensive procedure. Because there is currently no method for storing the embryos, they have to be immediately implanted into a host female whose estrus cycle is synchronized with the donor cow. Thus, a herd of host cows has to be available in order to supply compatible hosts.

With freezing techniques and non-surgical procedures for embryo removal and implantation, Professor Macpherson hopes to overcome existing drawbacks to enable the technique to be used as widely as artificial insemination. Freezing will allow storage of an embryo until a host cow reaches the time in her cycle appropriate for implantation of an embryo.

To maximize the reproductive capacity, Dr. Macpherson plans to use calves as the donor animals. Because calves don't cycle, their hormone levels remain relatively constant. When they are treated with hormones which induce superovulation, the results are more predictable. In mature animals naturally occurring hormones interfere with the superovulation-inducing hormones. Another advantage to using calves is that by starting earlier in the life cycle, more ova can be obtained from a single animal. Superovulation, combined with artificial insemination will enable the scientists to recover larger numbers of fertilized embryos from the calf with each ovulation. The frozen embryos may be held until the genetic merit of the female is confirmed, after she has completed at least one lactation.

Some fats are more beautiful than others, explains nutritionist

Jack Spratt, the man who would eat no fat, probably had a lousy diet. According to Professor B.J. Holub of the Department of Nutrition, not all fats are the villains they're often made out to be. Some types of fatty acids are essential to a healthy diet, explained the nutritionist who is conducting research on fatty acids under a Medical Research Council of Canada grant.

For the last two years he has been working at understanding more about what the body does with two types of fatty acids — linoleic and arachidonic, both essential to the body. Linoleic acid should make up at least one to two per cent of an adult's daily calorie intake, Professor Holub said. Linoleic acid is fairly common and most people obtain it through vegetable oils (found in margarine and shortening as well as salad and cooking oils). Arachidonic acid is synthesized by the body from linoleic acid.

These fatty acids are usually referred to as polyunsaturated because they are lower in hydrogen than other types of fats, especially animal fats which contain only low amounts of linoleic acid and are enriched in saturated fats. Some saturated fats have been linked with elevated cholesterol levels in blood, hardening of the arteries and other problems, he said, but little is really understood about why polyunsaturated fats don't have the same effect.

The link between cholesterol levels in the

blood and the polyunsaturated fatty acids, especially arachidonic acid, is one of the areas which Professor Holub is concerned about. He has found that these fatty acids are specifically processed by the body into compounds called phospholipids, and he believes that these play an important role in controlling blood cholesterol levels.

Much more work still has to be done before the role of the phospholipids is really under-



Professor Bruce Holub.

stood, but the nutritionist's previous research suggested that a diet with the proper amount of linoleic acid might be used to control cholesterol levels, and may even slightly reduce them. However, Professor Holub is quick to point out that exercise, smoking, drinking, and many other factors also affect levels of cholesterol in the blood.

Arachidonic acid is important to the blood system in other ways. It plays a role in the production of the hormone prostaglandin, which can control the rate of the heart beat and the constriction or dilation of blood vessels. Professor Holub is interested in exploring the metabolic mechanisms which change arachidonic acid into this important hormone, and the metabolic basis which makes the acid a vital nutrient for all cells in the body.

His experiments will continue for the next few years using small laboratory animals and pigs. The animals are fed on diets with varying levels of linoleic acid and other nutrients and then examined to see what effects they have had on them, he explained.

The research has shed new light on understanding the importance of some fats and related metabolic processes in the body, but the work on the incorporation of the two essential fatty acids into cellular phospholipids and their relations to cholesterol levels may have important ramifications for medical science in the future, Professor Holub said.

Conference to portray Canadian activist Nellie McClung

Professor Margret Andersen, Department of Languages, has been successful in obtaining funds from the Secretary of State, Secretariat for International Women's Year, and the Ontario Ministry of Labour, Women's Programs' Division, to organize a Nellie McClung Conference in Guelph, September 26, 27, and 28, 1975, under the sponsorship of the Guelph Council for International Women's Year in co-operation with the University of Guelph.

Born Nellie Letitia Mooney in 1873 in Grey County, Ontario, Nellie McClung personified Canadian feminism for the first quarter of the twentieth century. Nellie McClung was an activist: a prominent campaigner in the successful drives for female suffrage in Manitoba and Alberta, a nationally known feminist and social reformer, the only woman at the Canadian War Conference of 1918, an MLA in Alberta, the first woman member of the CBC's Board of Governors, and in 1938, a Canadian Delegate to the League of Nations. Sixteen books and numerous articles made her one of Canada's best known authors.

The three day conference will open September 26 with a historical display relating to Nellie McClung and her times, organised by the Wellington County Historical Research Society and taking place in the Wellington County Museum in Fergus. At 8 p.m. the play "What Glorious Times They Had" by

Diane Grant and members of the original cast will be performed by the Elora Community Theatre in the Wellington County Museum.

A number of workshops are arranged for Saturday, September 27, will take place in the Arts building. The topics are on women and prisons, women and alcohol, women and politics, pensions, benefits and insurance for women, sports and recreational activities for girls, and opportunities for girls in technical subjects.

On Saturday the keynote speaker will be Dr. Veronica Strong-Boag, History Department, Trent University, who has done extensive research on Nellie McClung and is the editor of the new edition of *In Times Like These*. Her topic will be "The Legislative Experiences of Nellie McClung."

On Saturday evening there will be a dinner at the University Centre. The speaker for the evening will be Nellie McClung's son, Mark, and his talk is entitled "Portrait of My Mother."

On Sunday, September 28, a trip to the birthplace of Nellie McClung in Chatsworth, Ontario, is planned. A remembrance tribute will be made and a picnic lunch will be held at Ainslie Woods Conservation Park. On the way home a brief stop at the homestead of Agnes McPhail has been planned.

There will be a charge for the dinner, the play, and the trip to the birthplace. There is

no registration fee for the conference workshops on Saturday and free babysitting is available on that day from 9:30 a.m. to 6:00 a.m.

For further information, contact Nellie McClung Conference, Department of Languages, Ext. 3883.

Dates, times, and places will be published in detail in the News Bulletin Next Week At Guelph, closer to the conference time.



Professor Margret Andersen.

CAMPUS BRIEFS

Applications up

As of July 18, the Ontario Universities' Application Centre had processed 145,790 applications for first year places in Ontario universities, from 57,955 applicants. The applicant figure represents a nine per cent increase over the previous year. Affirmative responses to offers of admission received to date are up four per cent over 1974. About two-thirds of the applicants come directly from Ontario secondary schools; applicants from this group are up six per cent over the previous year. The percentage of students enrolled in grade 13 who apply to university has been stable since 1973 at approximately 50 per cent according to figures released this month by OUAC.

Chairman of COU

Dr. J.R. Evans, President of the University of Toronto, has been elected Chairman of the Council of Ontario Universities. Dr. Evans succeeds Dr. W.C. Winegard, our former President. Other appointments announced this month by COU include: Dr. H.H. Yates, appointed Executive Vice-Chairman of the Ontario Council on Graduate Studies. He joins the COU Secretariat with a background of varied experience in teaching, administration and industry. Posts previously held by Dr. Yates include: Birks Professor of Metallurgy, chairman of the Department of Metallurgy, and Associate Dean of Engineering at McGill University; and Vice-President, Academic, at Ryerson Polytechnical Institute. Dr. F.W. Parrett succeeds Dr. H. Good whose term as Director of the Ontario Universities' Program for Instructional Development concluded on June 30. Dr. Parrett, a member of the Department of Chemistry at the Royal Military College, has had diverse experience as a teacher and researcher in the United Kingdom and Canada. A particular interest of Dr. Parrett's has been the use of computers in laboratory teaching. Dr. R.L. Watts, Principal of Queen's University, and Dr. E.J. Monahan, President of Laurentian University, have been elected to the Executive Committee.

Radio Gryphon

Radio Gryphon CFRU announces a number of new programs for the fall semester. The station, which aims to provide the sort of program not generally available to the public, will run series on industry and technology, working methods in agriculture, a documentary on the exploration of the world, fairy tales from the old world, and German food, to name just a few. In addition the station will continue to run programs from France, Sweden, Belgium, Japan, Israel, China, and Germany. Recently announced coordinator for the station is Susan Morphet who may be contacted at Ext. 8341. Complete program details will appear in the News Bulletin early in September.

A place to meet

Do you belong to associations, service clubs, youth groups, etc., that may need a place to meet? If so, then the Conference Office on campus is the place to go for service. The Conference Office wants more business. By encouraging groups to hold their meetings on campus, additional revenues for a number of departments are generated. These funds are used primarily to keep residence and food service fee increases to a minimum. For more information on facilities, rates and service, contact Central Reservations and Conferences Ext. 3015.

No early bird dip

Swimmers who rise early for a brisk 7:30 to 8:30 a.m. Early Bird Dip at the University pool can sleep in for a few weeks. The Early Bird Dip has been cancelled until Monday, September 8.

Wine production

Wine production will be the subject of a day-long symposium sponsored by the School of Engineering, Department of Food Science and the Wine Council of Ontario on Tuesday, September 2 in Food Science, Room 202. Dr. Gottfried Wurdig, director of the Institute for Wine Chemistry and Fermentation Physiology in Trier, West Germany, will speak on acid control in wine production by double salt (acidex) precipitation. There will be a discussion on present problems in wine production and a Weinprobe or winetasting. At the Weinprobe, limited to 50 people, Dr. Wurdig will present a typical collection of wines of the Mosel-Saar-Ruhr region, the northernmost white wine growing district of Germany. The collection contains fine vintages as well as wines adjusted by double salt precipitation. For further information, contact Professor A. Meiering, School of Engineering, Ext. 3832 or 2438.



The Canadian National Women's Field Hockey team played the New Zealand National team in an exhibition game at the University of Guelph Alumni Stadium August 14. New Zealand won the 3-1 game. New Zealand ranks second and Canada ranks 16th in women's international field hockey. Ontario has four players on the Canadian team. Here, Canadian goal-keeper Judith Lovett of Ontario, left, Philippa Lunn, a forward, of New Zealand, and Trudy Leishman, half-back, of New Zealand practice skirmish on campus August 15. The Canadian team left Saturday for Vienna, Austria, and the New Zealand team left Sunday night for Berlin, Hanover, and Hamburg. Both national teams will participate in the 1975 International Federation of Womens' Hockey Associations' Conference and Tournament in Edinburgh, Scotland, August 30 to September 10.

NEXT WEEK AT GUELPH

THURSDAY, AUGUST 21

Exhibition — CANDY FLOSS AND LION TAMERS, a display on the circus, McLaughlin Library until August 24.

Conference — WILDLIFE DISEASES, sponsored by OVC, College of Biological Science and Continuing Education. Contact: Professor R.C. Anderson, Zoology.

TV — SPOTLIGHT ON UNIVERSITY OF GUELPH, Cable 8 at 6:15 p.m.

FRIDAY, AUGUST 22

Conference — WILDLIFE DISEASES, last day. Contact: Professor R.C. Anderson, Zoology.

Worship — JUMA PRAYERS, 1:15 p.m., Arts 306.

TV — SPOTLIGHT ON UNIVERSITY OF GUELPH, Cable 8 at 5 p.m.

SUNDAY, AUGUST 24

Worship — PUJA, sponsored by the Hindu Cultural Society, 11 a.m., 8th floor lounge Arts; ZOHAR PRAYERS AND QURANIC DISCUSSION (open to all) 1 p.m., 9th floor lounge Arts.

MONDAY, AUGUST 25

TV — SPOTLIGHT ON UNIVERSITY OF GUELPH, Cable 8 at 7 p.m.

THURSDAY, AUGUST 28

TV — SPOTLIGHT ON UNIVERSITY OF GUELPH, Cable 8 at 6:15 p.m.

PERSONALS

FOR SALE

New portable dishwasher, 836-7113; Bell and Howell super 8 movie camera, zoom lens and projector, 70-watt amplifier, Fisher tuner, Acoustic Research speakers, 821-7574; Five-piece sectional chesterfield, washer and dryer, 824-6995; 1972 Ford Mustang, 821-8790; New set of Encyclopaedia Britannica, seven language dictionary, 822-4088; 1972 Datsun 1200, 821-7593 or 3613; Stereo combination, two love seats, Ann, 8715; Camera equipment, flash attachment with 22½ V. battery, 8775; 1967 Camaro, 821-7117; Chesterfield and chair, radio-record player, small cabinet model, 822-5141; 30" GE range, self-cleaning oven, 823-1863; Teak desk, GE dishwasher, Moffat continuous cleaning stove, informal dining room suite with six chairs, 821-2398 or 843-2570; To give away — mattress, upholstered rocking chair, fibreglass drapes, 824-4314.

MISCELLANEOUS

Wanted — Home for German Shepherd — Collie dog, free, Linda, 3703 or 836-7614; Set of used kitchen chairs, Alice, 3016 or 836-2218;

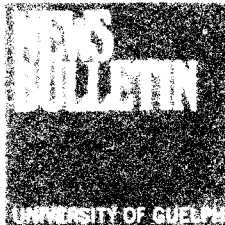
Willing to babysit from Monday through Friday, 821-6616.

HOUSING

For Rent — 3 bedroom bungalow near St. Joseph's Hospital to faculty or staff, no children, 822-3996; 3 bedroom townhouse near campus, enclosed garden and patio, mature couple only, sublet with renewal option. Available mid-September, 821-8042; Townhouse suitable for faculty or visiting professor with family, near university, furnished, 3 bedrooms, 2½ baths, available September to May, 824-7365; 3 bedroom house beginning October 1, Elaine, 821-9200 between 9 and 5 and 824-3855 after 5 p.m.

For Sale — Side split, close to university, 824-1653; 5 bedroom stone home, Elora area, 846-5954.

The News Bulletin is published every Thursday by the University of Guelph's Department of Information. News items must reach the editor, Sandra Webster, Information Office, 4th floor East, University Centre in writing by noon Friday. Articles and news items may be quoted or reproduced in full.



Job opportunities

Stenographer — Bilingual, Languages, salary grade 3, salary range \$117-\$156.

Purchasing Clerk — salary grade 3, salary range \$117-\$156.

Secretary (temporary) — Canadian Institute of Food Science and Technology Journal; starting salary \$2.75; For further information please call Dr. D.W. Stanley, Ext. 2283 or 2281.

Bilingual Secretary — Languages; salary grade 4, salary range \$130-\$172.

Custodian 3 — Housekeeping, job rate \$4.28; probation rate .20¢ per hour less than job rate.

Custodian 2 — Housekeeping, job rate \$3.97; probation rate .20¢ per hour less than job rate.

Custodian 1 (3 positions) — Housekeeping, job rate \$3.66; probation rate .20¢ per hour less than job rate.

Building Mechanic 3 — Maintenance; job rate \$5.70; probation rate .20¢ per hour less than job rate.

For further information please see bulletin boards or call Ext. 3058 or 3059.

Plant show at the Canadian National Exhibition

There is a nice touch of University of Guelph at the CNE this year. The Department of Horticultural Science has a display at the CNE Horticulture Building, located in the west side of the Exhibition grounds near the Jamieson Avenue exit. Someone will be in attendance at the exhibit from 10 a.m. to 10 p.m., including Saturday and Sunday, to answer any questions. The theme of CNE Horticulture display this year is Flowers of the World and includes flowers from Hawaii, Mexico and Australia. The University of Guelph exhibit is showing ancestor species of wild tomato, potato and geraniums, a display about plant tissue culture, dried flower arrangements by Mrs. Hedy Petersons and bottle gardens made by a Horticulture student. The exhibit continues to September 1.



When the temperature in his booth hit 38° (100°F), parking attendant William Leveque headed for the nearest shady spot.