

Mammalian Egg Transfer

[#mammalian egg transfer](#) [#embryo transfer mammals](#) [#assisted reproduction technology](#) [#animal breeding techniques](#) [#oocyte transfer](#)

Mammalian egg transfer is a pivotal technique in assisted reproductive technology, involving the collection of oocytes or embryos from a donor female and their subsequent placement into the reproductive tract of a recipient female. This process, often synonymous with embryo transfer in mammals, is crucial for genetic improvement in animal breeding, species conservation, and research into reproductive biology.

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Mammalian Egg Transfer

Egg transfer was first performed in 1890, but for half a century it received scant attention. However, since 1950 the technique has become increasingly widely used - in the laboratory for fundamental studies and more recently in practice, both veterinary and medical, to boost reproductive potential of genetically superior cattle and to overcome sterility due to impaired rubal function in women. As a result, a considerable body of literature has accumulated, totaling well in excess of a thousand references. But till now there has not been a single comprehensive text devoted solely to this subject. The present work was designed to meet that need at a time when the field is fast expanding with new techniques and approaches constantly being evolved. One need only cite the tremendous rate of progress in human egg transfer in the last three years. The work embraces laboratory and farm animals and primates, including man, altogether representing a total of 16 species.

MAMMALIAN EGG TRANSFER

updated throughout with new information on sexing embryos, sexing semen, marketing, cloning as well as the basics and economics of this technology. Glossary.

Embryo Transfer in Dairy Cattle

Developmental biology has been transformed recently by discoveries in the fields of molecular biology, cell biology, and immunology. New ways of manipulating mammalian development are uncovering control mechanisms and enabling us to apply them in solving practical problems in animal production and human health. This book outlines some of these new manipulations and how they have contributed to the present state of developmental biology. Chapter 1 describes gene transfer by micro injection of

cloned recombinant DNA into zygotes. Although the factors that affect transformation frequencies and integration sites are still unknown, such techniques offer a number of exciting prospects. Research models for human disease could be artificially created and desirable characteristics in agricultural animals could be enhanced. The theme of cell-to-cell transfer is continued in Chapters 2 and 3. Chapter 2 describes pronuclear transplantation by Sendai virus-induced fusion of the karyoplast with the enucleated embryo. Using this procedure, it has been demonstrated that both male and female genomes are essential for normal development, although the reason for this is not yet understood. Chapter 3 describes studies on the fusion of whole oocytes.

Manipulation of Mammalian Development

With a few notable exceptions, mammalian preimplantation embryos grown in vitro are likely to exhibit sub-optimal or retarded development. This may be manifested in different ways, depending on the species and on the stage(s) of embryonic development that are being examined. For example, bovine embryos often experience difficulty in cleaving under in vitro conditions, and usually cease development at about the 8-cell stage (Wright and Bondioli, 1981). The block to development is stage-dependent; embryos cultured for 24 hr from the 1-cell stage are much more capable of developing into viable blastocysts after transfer to oviducts than embryos cultured for 24 hr from the 4-cell stage prior to transfer (Eyestone et al., 1985). Similar problems with in vitro embryo development are encountered in other species. Pig embryos can be grown up to the 4-cell stage in vitro but usually no further (Davis and Day, 1978). In the golden hamster, in the rat and in many outbred strains of mice, development of zygotes in vitro is blocked at the 2-cell stage (Yanagimachi and Chang, 1964; Whittingham, 1975). Even with some inbred mouse strains, embryo development is reduced if very early cleavage stages are used as the starting point for in vitro culture (Spielmann et al., 1980). A common finding is that embryos grown in vitro have reduced cell counts (Harlow and Quinn, 1982; Kane, 1985) and their viability is reduced (Bowman and McLaren, 1970; Papaioannou and Ebert, 1986) compared to equivalent developmental stages recovered from mated animals.

The Mammalian Preimplantation Embryo

Thanks to enormous scientific efforts of the last decades, in vitro fertilization (IVF) and in vitro production (IVP) have now been introduced successfully in the practice of human infertility treatment and cattle breeding programs. This comprehensive book allows us to bridge the knowledge from both biomedical and veterinary fields of research. For the first time, studies concerning the human embryo as well as embryos from domestic species are brought together. The central theme of the book is "the assessment of mammalian embryo quality". In 15 chapters, written by well-known scientists, different aspects of the assessment of mammalian embryo quality are summarized. Non-invasive and invasive techniques to evaluate embryo quality are separated in two parts. In addition the book is provided with appendices on practical aspects and, thus, the book should be present in each laboratory for IVF and IVP.

Assessment of Mammalian Embryo Quality

It is a genuine honor and a privilege of distinction to provide the foreword for the proceedings that follow. This marvelous symposium reflects the unique qualities of its two principal sponsors. Whenever the Oregon Regional Primate Research Center is involved in matters of science, we see a consistent record of exceptional quality in both the work and the people who do it. Likewise, Serono Symposia, USA in assuring a world-class speakers' forum, utterly without taint of commercial influence. The proceedings published herein are a remarkable testimony, not only to the contributors, but to Drs. Brenner, Wolf, Stouffer, and Burnett, who have shepherded its conception, presentation, and publication. Readers will notice immediately one of the universal strengths of this total composition; that is, the diversity of investigational interests among attendees. Presentations on the core topic of primate in vitro fertilization and embryo transfer were joined by specialist presentations in related areas, including human-assisted reproductive technologies, reproductive physiology of the great apes, sperm biology, implantation mechanisms, cryobiology, coculture systems for embryogenesis, micromanipulation technologies, and genetic diagnosis of heritable diseases in the pre embryo. Even though pro-fertility issues understandably dominated this forum, there was significant attention given to fertility-control research, especially the role of primates in this endeavor (more on this subject below).

In Vitro Fertilization and Embryo Transfer in Primates

Elements of Mammalian Fertilization, Volume 2 discusses in vitro fertilization (IVF) in humans and domestic animals and provides insight into potential applications of contemporary experimental approaches to contraceptive development. Topics covered include the origins and history of human IVF, technical considerations and diverse factors that often determine the success or failure of human IVF, the application of IVF to domestic animals, and the application of gamete biochemistry and molecular biology toward development of novel methods of contraception. This volume addresses some of the most exciting technological developments that have occurred over the past decade, developments that have already dramatically affected our lives and will continue to do so in the future. It is an important reference source for research scientists, clinicians, and advanced graduate and medical students.

In Vitro Fertilization and Embryo Transfer

The use of human in vitro fertilization in the management of infertility is the outgrowth of years of laboratory observations on in vitro sperm-egg interaction. "The editors of this work have themselves contributed significantly to basic knowledge of the mammalian fertilization process. The observations of Don Wolf on sperm penetration, the block to polyspermy and, most recently, sperm hyperactivation in the monkey and human, Gregory Kopf's elucidation of the mechanisms of sperm activation during penetration and the reciprocal dialogue between sperm and egg, and Barry Bavister's definition of culture conditions and requirements necessary for in vitro oocyte maturation, fertilization and development in model mammalian systems including nonhuman primates have contributed greatly to our understanding of the mammalian fertilization process. Wolf, Kopf and Gerrity have enjoyed substantial interaction with clinicians in Departments of Obstetrics and Gynecology and have been directly involved with successful IVF programs. Both Wolf and Kopf have served as research scientists in the Division of Reproductive Biology at the University of Pennsylvania, which, for more than 22 years, has fostered co-mingling of clinically oriented and basic science faculty. It is through such interaction, which clearly exists at many institutions including the University of Wisconsin, that the process of technology transfer is best served. Without an exquisitely coordinated laboratory, there can be no consistent success in human in vitro fertilization. Quality control is pivotal, but close collaboration between the laboratory and the clinic is also essential as information is shared and correlated.

Elements of Mammalian Fertilization

3000 new references added since the first edition Gives information necessary to produce embryos totally through in vitro techniques Shows commercial applications of embryo and oocyte research Cattle remain at the forefront of many new developments in reproductive technology and what can be done for the cow today will later be applicable to other farm livestock and perhaps humans. This new edition reviews the considerable advances and issues in embryo production technology, based on reports since the first edition in 1994. This is a must have volume for those who own the first edition, and in itself an incredibly informative text.

In Vitro Fertilization and Embryo Transfer

Methods in Mammalian Reproduction ...

Implantation in Mammals

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The Mammalian Egg

This comprehensively updated and expanded second edition builds on its successful and popular predecessor, retaining the practical features which made the first edition such an essential guide to IVF. The edition describes additions to the range of ART clinical treatments, including the use of testicular and epididymal sperm, blastocyst stage transfer, and new perspectives in cryobiology and cryopreservation techniques. By incorporating laboratory techniques and protocols, with an even greater emphasis on quality control, it provides an indispensable and practical account. The introductory chapters covering the scientific background that underpins effective laboratory practice have been substantially expanded, derived from research in mammalian systems into the molecular biology of oogenesis, oocyte maturation, and early embryo metabolism. This second edition distils a wealth of practical and scientific detail for the benefit of all IVF practitioners.

Laboratory Production of Cattle Embryos

The births of more than 100 apparently normal infants at term following pregnancies initiated by in vitro fertilization and embryo transfer testifies to the successful clinical application of insights obtained from studies in reproductive biology over the last 20 years. In women, these studies have included: 1) characterization of the changes in blood hormone profiles throughout ovulatory menstrual cycles; 2) documentation of the hormonal composition of antral fluid in developing and degenerating preovulatory follicles; 3) correlation of these observations with the state of oocyte maturation and the fertilizability of the oocyte; 4) application of pharmacologic agents for perturbing the normal hormone profiles to regulate the number of preovulatory follicles developing and the time of ovulation; and 5) development of non-invasive methods for monitoring follicular development. Optimizing methods for maturing and fertilizing eggs, for monitoring normal development in vitro, and for transferring and achieving implantation of embryos are continuing concerns of physicians and scientists responsible for extant programs. In addition, all serious students of reproductive biology should critically examine every facet of the processes which must concatenate to assure birth of normal infants following pregnancies achieved by these methods. However, the literature which contains the informational substrate is dispersed widely in a plethora of journals not always readily accessible. Bringing the essentials together facilitates both rapid retrieval of data and access to relevant literature.

Reproduction in Mammals: Embryonic and fetal development

Looks at the latest technologies for human reproduction, the challenges of fertility research, and the controversies surrounding it.

Methods in Mammalian Reproduction

This comprehensive, step-by-step laboratory training manual brings all the elements for a successful embryo transfer program together in a simple, organized, illustrated format. For the last several decades, artificial insemination has allowed genetic progress to be achieved relatively quickly through the widespread and efficient use of frozen semen. As a result of the advancement of embryo transfer

(ET) techniques, cows can produce many offspring. A more rapid genetic gain is achieved which complements an artificial insemination program.

In Vitro Fertilization and Embryo Transfer

This book provides the Assisted Reproduction Technologies (ART) community an update of the fast approaching novel technologies that may allow improved assessment of the reproductive potential of sperm, oocytes and embryos. The reader has access to concise updates on the rapidly developing diagnostic technologies (genomics, transcriptomics, proteomics and metabolomics) and morphological methods which may help us better assess the gametes and embryos. Methodologies are described which enable selection of the best gamete or embryo by invasive and non-invasive diagnostics, as well as the clinical validity of these techniques.

In Vitro Fertilization and Embryo Transfer in Primates

New developments in reproductive technology have made headlines since the birth of the world's first in vitro fertilization baby in 1978. But is embryo experimentation ethically acceptable? What is the moral status of the early human embryo? And how should a democratic society deal with so controversial an issue, where conflicting views are based on differing religious and philosophical positions? These controversial questions are the subject of this book, which, as a current compendium of ideas and arguments on the subject, makes an original contribution of major importance to this debate. Peter Singer is the author of many books, including *Practical Ethics* (CUP, 1979), *Marx* (Hill & Wang, 1980), and *Should the Baby Live?* (co-authored with Helga Kuhse, Oxford U.P., 1986).

Cell Biology of Mammalian Egg Manipulation

Designed as an aid for all clinicians and scientists who are currently engaged in the field of in vitro fertilization and other assisted conception techniques. The book provides a comprehensive account of gamete and embryo quality, and reflects up-to-date assessment of current knowledge.

In Vitro Fertilization

Gamete maturation. Towards a molecular understanding of meiosis in domestic animals. Biology of oocyte maturation. Post-meiotic sperm development in mammals. Molecular probes for testing bovine sperm quality. Fertilization and embryonic development. Fertilization by assisted micromanipulation of gametes. In vitro fertilization in farm animals. Culture of embryos of farm animals. Maternal control of early embryonic development. Inter - and extraspecies pregnancies in equids. Embryonic manipulation and genetic engineering. Gender preselection in mammals. Embryo multiplication in livestock. Present procedures and the potential for improvement. Gene transfer in farm animals. Mechanism of sperm - DNA interaction. Spermatozoa as vectors for introducing exogenous DNA into eggs. Embryonic stem cells from domestic animals. Establishment and potential applications. New trends in embryo transfer. Embryo transfer and new technology in sheep reproduction. Embryo production in vivo: problems and prospects. Embryotechnology in dairy cattle breeding. Practical application of two advanced biotechnologies to bovine embryo transfer: splitting and sexing. Theoretical and practical aspects of equine embryo transfer. Embryo technology in pets and endangered species. Reproductive biotechnology in deer farming. Vitrification of oocytes and embryos. International regulations. Tentative prospective and health regulations of the embryo transfer industry.

Human in Vitro Fertilization and Embryo Transfer

In this refreshingly integrated account, the author reviews reproductive function in humans, wild and domestic mammals, highlighting the loci suitable for manipulation. *Controlling Reproduction* is a practical comparative text which will be of interest to anyone concerned with mammalian reproduction.

Baby-Making

Embryo cleavage experiences a series of critical events and remarkable epigenetic modifications, especially morphological change and gene expression. The development of current assisted reproductive technology has created some new observations and novel discoveries in cleavage embryos. This book updates some new technologies and methods on the study of cleavage embryos to select high-quality embryos for transfer and improve embryo implantation and pregnancy. Major contents include embryo cleavage morphokinetics based on time-lapse imaging, gene expression of cleavage

embryo and noninvasive assessment, and improving embryo cleavage technology. Thus, this book will greatly add new information for embryologists to select good-quality embryos for transfer to improve human embryo transfer pregnancy rate.

Cattle Embryo Transfer Procedure

This book results from a study by a committee of the Institute of Medicine and the National Research Council's Board on Agriculture. The committee examined the scientific foundations of medically assisted conception and developed an agenda for basic research in reproductive and developmental biology that would contribute to advances in the clinical and agricultural practice of in vitro fertilization and embryo transfer. The volume also discusses some barriers to progress in research and ways of lowering them, and explains the scientific issues important to ethical decision making.

Gamete and Embryo Selection

The field of human artificial reproductive technology (ART) is continually advancing and has witnessed significant changes since the inception of Louise Brown in 1978. Though Louise Brown herself was conceived after the transfer of a blastocyst, there remain significant confusion and debate regarding the stage at which the human embryo conceived in the laboratory should be replaced in the mother. Developments in culture media formulations, leading to the introduction of sequential media, have brought the role of the blastocyst in human ART back into the spotlight. It was due to this resurgence of interest in the niche of extended culture in human infertility treatment that the symposium on "ART and the Human Blastocyst" was held. The proceedings of this meeting within this volume bring to the forefront the main issues raised with the transfer of embryos at the blastocyst stage. It is evident from the chapters that follow that ART needs to be perceived as a continuum of procedures, each one dependent on the preceding one, and all equally as important as each other. That is to say, the development of a competent embryo is ultimately dependent on the quality of the gametes from which it was derived. With regard to the oocyte, this then places the emphasis on the physician to use a stimulation protocol that both produces quality oocytes and does not impair endometrial function. Maintenance of gamete and embryo quality is the laboratory's role.

Embryo Experimentation

Provides background information and detailed protocols for developing a mouse colony and using the animals in transgenic and gene-targeting experiments. The protocols list the animals, equipment, and reagents required and step-by-step procedures. Topics include in vitro culture of preimplantation embryos, surgical procedures, the production of chimeras, and the analysis of genome alterations. The third edition adds protocols for cloning mice, modifying embryonic stem cells, intracytoplasmic sperm injection, and cryopreservation of embryos.

Molecular Biology of The Cell

Human embryology is now rapidly moving to a new phase due to recent innovation and advances of life science including ES and iPS technology. This new era also directs a difficult challenge for scientists in terms of technological and ethical issues for future human embryology. However, human embryology is difficult to research due to ethics involved in the collection of human materials. This book traces the early history and provides knowledge on demonstration of principles from ancient to the most recent embryo studies amidst the unresolved scientific and ethical issues. We hope this book will help the readers to understand human embryo development better.

Gamete and Embryo Quality

A variety of new techniques that promise to revolutionize the clinical management of early pregnancy are fully detailed in this state-of-the-art book. Leading international researchers describe fast-moving topics such as embryo manipulation and the diagnosis of congenital abnormalities. The technology of assisted reproduction has made it possible to study living embryonic material for the first time, which has led to rapid advances in our understanding of the human embryo's early development. For example, study of the embryo in the test tube has pointed to early pregnancy loss as a possible cause of later infertility. Even more important, diagnostic tests using sophisticated techniques of molecular biology can be run on single cells before the embryo is replaced in the uterus. Another area of advance is the diagnosis of congenital abnormalities in the first and second trimesters of pregnancy. Great

improvements have been made in the techniques of chorion villus biopsy and ultrasound imaging. A spectrum of simple biochemical tests performed on the mother's blood can greatly improve the detection of Down syndrome and other chromosome defects. Together with other developments in the fields of molecular biology and endocrinology, these new diagnostic techniques are the beginning of a new age in clinical human genetics and embryology.

Embryonic Development and Manipulation in Animal Production

The advent of assisted conception procedures such as in-vitro fertilisation (IVF) has provided the impetus for exploration of the factors that lead to the establishment of pregnancy. This collection of papers from leading research workers brings together current concepts of the processes which may be of importance in implantation. The complex signals from the embryo to the ovary, endometrium and myometrium are now being revealed through studies in both primates and other mammalian species. This book addresses the interrelationship of pituitary and ovarian hormones in controlling ovulation and the preparation of the intrauterine environment for implantation. Once fertilisation has occurred and trophoblast has formed, the next vital step is the production of materials which signal the presence of the pregnancy to the rest of the body. Trophoblastic proteins and other early-pregnancy factors are prime candidates for this role. Recent studies have emphasised the importance of the intrauterine environment in implantation. Specific secretory products of the endometrium have great potential in this process. The prostaglandins also play an essential part. Immunological adjustments are now considered a condition for the successful establishment of pregnancy. The possible use of immuno therapy in the treatment of recurrent abortion has highlighted interest in this area. The use of immunological techniques for contraception are in their infancy but offer much hope for the future.

Embryonic Development and Manipulation in Animal Production

These research studies cover human embryo and fetal tissue research, providing a concise overview of the subject; legal issues in embryo and fetal tissue research and therapy; origins, state of the art, future applications, and implications of human fetal tissue research; a survey of use and handling of human reproductive tissues in Canadian health care facilities; a survey of medical laboratories and medical waste disposal firms related to use and handling of human reproductive tissues; embryo transfer and related technologies in domestic animals; and the past, present, and future of human embryo research.

Controlling Reproduction

Techniques for Freezing Mammalian Embryos