

Editorial Board

**James Crabtree BVMS
CertEM(StudMed) MRCVS**

Independent Veterinary Consultant,
Equine Reproduction & Stud
Medicine, Equine Reproductive
Services (UK) Ltd., High Farm,
33 Westgate, Old Malton, North
Yorkshire, YO17 7HE

**Andrew Fiske-Jackson BVSc
MVetMed DipECVS MRCVS**

Andrew is a European and RCVS
Specialist in Equine Surgery,
Lecturer in Equine Surgery at the
Equine Referral Hospital, Royal
Veterinary College, North Mymms
AL9 7TAS

**Kate McGovern BVetMed
CertEM(IntMed) MS DACVIM
DipECEIM MRCVS**

Kate is American, European and
RCVS Specialist in Equine Internal
Medicine, Donnington Grove
Veterinary Group, Oxford Road,
Newbury, Berks, RG14 2JB

**Russell Parker BVSc MSc
DipECVS MRCVS**

Russell is a European and RCVS
Specialist in Equine Surgery,
Liphook Equine Hospital, Forest
Mere, Liphook, Hants, GU30 7JG

**David Rendle BVSc MVM
CertEM(IntMed) DipECEIM
MRCVS**

David is a European and RCVS
Specialist in Equine Internal
Medicine at Rainbow Equine
Hospital, Rainbow Farm, Old
Malton, North Yorkshire, YO17 6SG

Advanced technologies

This issue of UK-Vet Equine is dedicated to equine reproduction, and we have interesting and practical articles on the management of the transitional mare; the 'difficult mare'; monitoring of the early pregnancy; and failure of passive transfer of immunity in foals. From an editorial viewpoint, I take this opportunity to highlight the current status of advanced equine reproductive technologies and their availability in the UK.

The use of chilled and frozen semen for artificial insemination (AI) is now commonplace in the UK, and the BEVA approved AI list has proved a popular scheme. Embryo transfer (ET) is a commonly-applied technology, performed both in practice and in select ET centres around the UK. These centres also have recipients available for hire and offer transported embryo services to practitioners in the field, whereby recipients are synchronised to the donor mares and any embryos recovered are shipped by same-day courier for transfer into the recipient, reducing the labour intensity for the vet in the field and using the equipment and skills of the centre vets for the transfer portion of the process. Such services have proved successful and popular.

Beyond this, progress has been slow in the UK, likely not helped by the uncertainties surrounding the UK's exit from the European Union (EU). Nevertheless we are now starting to see some exciting developments, with ovum pick-up (OPU) services now being available. OPU is the collection of ova (eggs) directly from the follicles in the mare's ovary for the purpose of in vitro production of embryos — through a process known as intra-cytoplasmic sperm injection (ICSI) with genetic material from the sperm injected into the cytoplasm of the egg in vitro, the fertilised eggs being cultured to develop into embryos. These embryos can be frozen, then thawed and transferred into a recipient mare — much like in traditional embryo transfer. As ICSI is not yet performed commercially in the United Kingdom, the mare's eggs are shipped to one of the world's premier laboratories in Italy, where the ICSI and embryo culture is performed, then the frozen embryos are shipped back to the UK. The likely success of the procedure was recently reviewed by Dr. Anthony Claes from the University of Utrecht, The Netherlands and presented at a workshop in Leipzig, Germany this January. He reported a 57% oocyte recovery with an average of 1.63 frozen embryos produced per OPU session and approximately 68% of OPU's resulting in the production of more than one frozen embryo. These are exciting prospects but we have to acknowledge an individual mare (and stallion) effect on the process, as not all OPU procedures result in production of an embryo. This technique does, however, provide us with an option for the production of embryos from mares that are unable to conceive via more traditional means.

Post mortem recovery of oocytes from a mare's ovary also enables us to rescue the genetic potential of a mare after death. One of our clients was very fortunate to have three embryos produced in this way. It was logistically extremely difficult to get the appropriate health tests, the oocytes and necessary semen to the lab in Italy by the following day; however, it is an avenue that was not available to us before. Recovery of the genetic potential of a stallion after death is much more accessible, with some centres offering epididymal sperm recovery and freezing, although again logistically it can be a challenge to get the testicles to an appropriate centre.

Cloning is viewed by some as ethically debatable, but there are accumulating number of cloned horses being produced across the world. It is possible to collect tissue samples and grow cell lines that can be frozen and banked as an insurance policy. The genetic material from such cell lines can be injected into donor oocytes to produce embryo clones. This is a service accessible to us in the UK, using cloning that is commercially available in laboratories in the EU, Canada, Argentina, Brazil, Colombia and the USA. **EQ**



James Crabtree
Editorial Board
Member

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