

# Morphology and chronology of pre-implantation embryonic development of red deer (*Cervus elaphus*)

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The *in vitro* culture of red deer (*Cervus elaphus*) embryos recovered from superovulated red deer hinds results in a low proportion developing to blastocysts, slow development rates and a low number of nuclei per morula and blastocyst (Berg *et al.*, 1994). These results differ from those for the *in vitro* culture of sheep and cattle embryos and may be a consequence of inadequate culture conditions or a real physiological difference among species. In this study we describe the early development of red deer embryos and their location in the reproductive tract from day 3 to 10 of gestation.

Eighteen cycling, non-pregnant red deer hinds (culled for temperament) were synchronized to generate day (D) 3, 5, 7 and 10 embryos at slaughter (onset of oestrus = D 0). Synchronization followed a 12-day intravaginal CIDR-type G® device with PMSG (200 iu) administered at device withdrawal. Hinds were then placed with a fertile stag and oestrous behaviour was recorded during 48 h of continuous observation. The reproductive tract of each hind was removed after slaughter. The tract was trimmed and the ipsilateral side to the corpus luteum (CL) was flushed segmentally. The oviduct was flushed

with 5 ml HEPES synthetic oviduct fluid (SOF). The uterotubal junction containing 1 cm of the uterine tip was severed from the horn with the flushings collected at the cut end. The remaining uterine horn was flushed toward the severed end of the uterine tip with 20 ml HEPES SOF. Flushings were inspected by stereomicroscopy, the embryos morphologically classified and stained with 10 µg/ml Hoescht 33342, to determine the number of nuclei. The CL was removed from the ovary and the weight was recorded.

Results, given in Table 1, demonstrate that morula stage embryos were located in the oviduct and compaction of morulae occurred at low cell numbers. Only blastocyst stage embryos were recovered from the uterus and the number of nuclei covered a wide range (66-114). This is in contrast to both sheep and cattle, where 8-16 cell stage embryos enter the uterus 3-4 days following ovulation.

## REFERENCE

- Berg, D.K., Thompson, J.G., Pugh, P.A., Tervit, H.R. & Asher, G.W. 1994. *In vitro* culture of early cleavage stage embryos recovered from superovulated red deer (*Cervus elaphus*). *Theriogenology* 41:160.

see Table 1 overleaf

**Table 1.** Age, location, stage of development and number of nuclei for each embryo

Age of embryo from onset of oestrus (h)	Location	Stage of development	Nuclei per embryo	CL weight (g)
96	Oviduct	8 cell	8	0.29
124	Oviduct	16 cell	16	0.21
137	Oviduct	morula	34	0.42
138	UTJ	tight morula	12	0.35
180	UTJ	blastocyst	114	0.53
180	Uterus	blastocyst	66	0.37
182	Uterus	blastocyst	97	0.39
186	UTJ	degenerate	N/D	0.26
190	Uterus	expanded blastocyst	97	0.41

N/D not determined, poor quality embryo, CL pale undefined.

UTJ - uterotubal junction.