

Superovulatory Response, Oocyte Spontaneous Activation, and Embryo Development in WMN/Nrs Inbred Rats

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Abstract :

WMN/Nrs inbred rats have been widely used in radiation biology for years. However, their reproductive profile has never been examined. We examined various reproductive characteristics of WMN/Nrs inbred rats such as superovulatory response, oocytes spontaneous activation (OSA), and embryo development *in vitro* and *in vivo*. Superovulation was induced in 3- to 9-week-old females by injection of 150 IU/kg PMSG and 150 IU/Kg hCG by 48 h apart. Only 8- and 9-week-old animals superovulated averaging 31.4 and 43.9 oocytes, respectively, and superovulation did not depend on estrous cycle. Animals 3-7 weeks of age did not superovulate. Because Wistar strains have been known to show a high incidence of OSA, factors expected to affect OSA in WMN/Nrs, including the time interval of various steps from euthanasia to oocyte recovery, incubation media, estrous cycle, and anesthetic treatments, were examined. The time from animal euthanasia to oviduct excision was the only factor shown to affect OSA. We also compared *in vitro* and *in vivo* embryo developmental competence between embryos obtained by natural ovulation and superovulation. Although percent *in vitro* development of 2-cell embryos to blastocysts was similar for embryos obtained by natural ovulation (63.7%) and superovulation (69.7%), fetus development after oviductal transfer of 2-cell embryos was significantly lower in embryos obtained by superovulation than in those obtained by natural ovulation (60.2% vs. 87.5%, $P=0.02$). Our results provide important normative data regarding future applications of rat assisted reproductive technologies (ARTs) such as *in vitro* fertilization and cryopreservation in WMN/Nrs strain and may be applicable to other strains of laboratory rats.

Key Word :

embryo development, inbred WMN/Nrs rats, oocyte spontaneous activation, superovulation

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