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Effects of Various Extenders and Permeating Cryoprotectants on Cryopreservation of Cynomolgus Monkey (*Macaca fascicularis*) Spermatozoa

YA-HUI LI^{*,†,‡}, KE-JUN CAI^{*}, ANDRAS KOVACS[§] AND WEI-ZHI JI^{*}

From ^{*} Kunming Institute of Zoology, Chinese Academy of Sciences, Kunming, Yunnan, China; [†] Graduate School of the Chinese Academy of Sciences, Beijing, China; [‡] College of Food Science and Technology, Yunnan Agricultural University, Kunming, Yunnan, China; and [§] Research Institute for Animal Breeding and Nutrition, Herceghalom, Gesztenyes, Hungary.

Correspondence to: Prof Weizhi Ji, Kunming Institute of Zoology, Chinese Academy of Sciences, 32 Jiaochang Donglu, Kunming, Yunnan, 650223, China (e-mail: wji@mail.kiz.ac.cn).

The cryoprotective effects of 11 different extenders, TTE, DM, mDM, LG-DM, G-DM, TCG, TEST, TSM, Test-M, Test-H, and LM, on sperm cryopreservation of cynomolgus monkey (*Macaca fascicularis*) have been compared with glycerol as cryoprotectant. Sperm motility, plasma membrane, and acrosomal integrity were examined to evaluate frozen-thawed sperm function. The results showed that TTE, DM, mDM, LG-DM, G-DM, and TCG exhibited the best and similar protective efficiencies for cynomolgus monkey sperm cryopreservation in terms of sperm motility and plasma membrane integrity ($P > .05$). The acrosomal integrity for spermatozoa cryopreserved in TCG was statistically lower than that of TTE, DM, mDM, LG-DM, and G-DM ($P < .05$) but was significantly higher than that of TEST, TSM, Test-M, Test-H, and LM ($P < .05$). The postthaw sperm motility for 5 other extenders (TEST, TSM, Test-M, Test-H, and LM) did not exceed 30%, and the 3 sperm parameters evaluated for them were significantly lower than that of TTE, DM, mDM, LG-DM, G-DM, and TCG ($P < .05$). On the basis of these findings, 5 commonly used permeating cryoprotectants, glycerol, ethylene glycol, dimethyl sulfoxide, acetamide and propylene glycol have further been tested for their effectiveness on sperm cryopreservation in extenders of TTE, DM, mDM, LG-DM, G-DM, and TCG. The results showed that the sperm cryoprotective efficiencies of glycerol and ethylene glycol were similar and best among 5 permeating cryoprotectant treatments ($P > .05$). Dimethyl sulfoxide or acetamide resulted in average cryoprotection for cynomolgus monkey spermatozoa: poorer than glycerol or ethylene glycol but better than that of propylene glycol ($P < .05$). In addition, the action of permeating cryoprotectant appeared to be independent of extenders. The results in the present study demonstrate that 1) TTE, DM, mDM, LG-DM, G-DM, and TCG are excellent extenders and suitable for cynomolgus monkey sperm cryopreservation; 2) the mechanism of action of permeating cryoprotectants are not affected by extender composition; 3) ethylene glycol has a similar cryoprotective efficacy to glycerol that makes it a successful cryoprotectant for sperm cryopreservation in cynomolgus monkeys.

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