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The Question of Abnormalities in Mouse Clones and ntES Cells

Teruhiko Wakayama Ph.D.

Laboratory for Genomic Reprogramming Center for Developmental Biology (CDB), RIKEN Kobe 2-2-3 Minatojima-minamimachi Chuo-ku, Kobe 650-0047, JAPAN

Tel 81-78-306-3049; Fax 81-78-306-0101; E-mail teru@cdb.riken.go.jp

ABSTRACT

Since it was first reported in 1997, somatic cell cloning has been demonstrated in several other mammalian species. On the mouse, it can be cloned from embryonic stem (ES) cells, fetus-derived cells, and adult-derived cells, both male and female. While cloning efficiencies range from 0 to 20%, rates of just 1-2% are typical (*i.e.* one or two live offspring per one hundred initial embryos). Recently, abnormalities in mice cloned from somatic cells have been reported, such as abnormal gene expression in embryo (Boiani *et al.*, 2001, Bortvin *et al.*, 2003), abnormal placenta (Wakayama and Yanagimachi 1999), obesity (Tamashiro *et al*, 2000, 2002) or early death (Ogonuki *et al.*, 2002). Such abnormalities notwithstanding, success in generating cloned offspring has opened new avenues of investigation and provides a valuable tool that basic research scientists have employed to study complex processes such as genomic reprogramming, imprinting and embryonic development. On the other hand, mouse ES cell lines can also be generated from adult somatic cells *via* nuclear transfer. These 'ntES cells' are capable of differentiation into an extensive variety of cell types *in vitro*, as well assperm and oocytes *in vivo*. Interestingly, the establish rate of ntES cell line from cloned blastocyst is much higher than the success rate of cloned mouse. It is also possible to make cloned mice from ntES cell nuclei as donor, but this serial nuclear transfer

method could not improved the cloning efficiency. Might be ntES cell has both character between ES cell and somatic cell. A number of potential agricultural and clinical applications are also are being explored, including the reproductive cloning of farm animals and therapeutic cloning for human cell, tissue, and organ replacement. This talk seeks to describe both the relationship between nucleus donor cell type and cloning success rate, and methods for establishingntES cell lines.