

# Development of Holstein Heifers from *In vivo* or *In vitro* Produced Embryos Transferred to Beef Cattle

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The average North American dairy cow has only 2.5 lactations making it difficult to generate replacements. The demand for good replacement heifers might be economically met, in part, using beef recipients of dairy embryos. Compared to dairy cows, beef cows have high fertility and conception rates, a large number is available for breeding in a controlled time frame, and management is low cost. Embryos produced *in vitro* (IVP; "in the dish") are less costly than those developed *in vivo* (IVD; in the donor cow), and direct transfer of embryos, like artificial insemination, is practical on the farm. These advances may enable mutual benefits; reduce dairy production costs and add value to cow/calf production. Our objective is to determine if dairy heifers reared in a beef management system are as productive as replacements from a conventional dairy system. Forty-nine beef cows were recipients of IVD Holstein embryos; 22 (44%) were pregnant at 130 days, 19 (39%) calved; 18 calves survived (2 mo) of which 12 (25%) were heifers. One-hundred thirty six beef cows were recipients of IVP embryos; 53 (39%) were pregnant at 130 days, 52 (39%) calved; 42 calves survived, of which 16 (12%) were Holstein heifers. Body weight of IVP heifers was 4 kg greater ( $P=0.06$ ) at birth, but at 2 mo. of age similar ( $P>0.05$ ) to IVD heifers. At 2 mo. of age 1/3<sup>rd</sup> of IVD and 1/3<sup>rd</sup> of IVP heifers were weaned and transferred to a conventional dairy farm. The remaining calves went to pasture until fall-weaning at 6-mo of age, and at that time, assigned to one of two outdoor beef rearing facilities with or without supplemental lighting to extend the winter photoperiod to 16 h/day. Body weight, height and height:weight ratio ( $1.32 \pm 0.02$  cm/kg) at 6 mo. did not differ ( $P>0.05$ ) among groups. Further growth and development data are being collected.

**Take Home Message:** Replacement dairy heifers can be economically produced using beef cattle as recipients for *in vitro* (IVP) or *in-vivo* (IVD) derived dairy embryos. Heifers born of *in vitro* and *in vivo* produced embryos had comparable growth rates.