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STUDIES ON THE SIZE AND MORPHOLOGICAL OBSERVATION OF  
SUPEROVULATED EMBRYOS FROM IMMATURE MICE

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Preimplantation embryos were recovered at 12 hour intervals from 16.5 to 124.5 hours after an HCG injection. The developmental stages and the size of these embryos were determined.

Nine hundred and twenty-five embryos were recovered from 32 mice, and the mean number of embryos per mouse was 29.8. 1-cell, 2-cell, 4-cell, 8-cell and 16-cell embryos, morulae, early, late and hatching or hatched blastocysts were recovered at 16.5–28.5, 28.5–52.5, 52.5–70.5, 64.5–76.5, 70.5–76.5, 70.5–112.5, 82.5–112.5, 88.5–124.5 and 100.5–124.5 hours after the HCG injection, respectively.

From the recovered embryos, the outer diameters of zonae and the diameters of individual blastomeres, vitelli and blastocoeles of 376 normal embryos were measured from photographs. The sizes of embryos were estimated by their areas as calculated from the various diameters. The mean area of whole embryos was almost constant from 1-cell embryos to early blastocysts ( $7,037\text{--}7,442\ \mu\text{m}^2$ ), but the mean area in late blastocysts ( $8,798\ \mu\text{m}^2$ ) was very large. The mean area of vitelli increased from 1-cell embryos ( $3,838\ \mu\text{m}^2$ ) to 4-cell embryos ( $4,928\ \mu\text{m}^2$ ), then decreased from 8-cell embryos ( $4,750\ \mu\text{m}^2$ ) to morulae ( $3,947\ \mu\text{m}^2$ ). This increase and decrease was supposed to be derived from the changes in space between blastomeres, which were produced during cell division. The mean area of vitelli increased again from early blastocysts ( $4,731\ \mu\text{m}^2$ ) to late blastocysts ( $7,394\ \mu\text{m}^2$ ), and decreased after hatching ( $6,510\ \mu\text{m}^2$ ). In late blastocysts, blastocoeles expanded so greatly that the areas of whole embryos and vitelli were significantly larger than in other stages ( $p < 0.01$ ).

Until the morula stage, the mean cell number of embryos increased in an exponential manner, and the size of individual blastomeres showed an approximately logarithmical decrease with time.

From these results, it was suggested that the sizes of embryos showed little change until the morula stage, while subsequent blastocoele formation, expansion and hatching caused the blastocysts to change in sizes.