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New measurement of DNA could help identify most viable embryos for IVF

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(PhysOrg.com) -- Scientists from the University of Warwick and University Hospitals Coventry and Warwickshire NHS Trust, are the first to directly measure a specific region of DNA in human embryos. The length of this region could be a quality marker for embryonic development.

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Researchers at the University of Warwick's Warwick Medical School and University Hospital, Coventry, have measured telomeres, regions of repetitive DNA at the ends of a chromosome which protect it from deterioration. Telomeres shorten each time a cell divides and when telomere length becomes critically short, the cells die.

The research, published in *Molecular Human Reproduction Journal*, suggests that telomere length is shortest in the early stages of an embryo's development, at around two days, and then lengthens just before implantation in the womb at five days. This lengthening may be essential for normal development, because short telomeres may not be enough to survive the many rounds of cell division that take place as embryos grow.

Lead authors Professor Geraldine Hartshorne, from the University of

Warwick's Warwick Medical School, and Sarah Turner, from University Hospital, Coventry, said this discovery could have implications for IVF treatment.

Professor Hartshorne said: "It has already been shown that artificially shortened telomeres cause problems in animal embryos. Human embryos are highly variable, and many of them cannot develop normally. We think that telomere length might one day be used to help diagnose which are the most viable embryos. We also know that telomeres shorten with oxidative stress, so telomere length might also provide a measure of the stressfulness of the culture systems that we use in IVF and their impact on embryos."

The research project used oocytes and embryos donated by patients undergoing IVF treatment. Only material that could not be used for the patients' own treatment was accessed for research.

Sarah Turner said: These results have given us plenty of new questions as well as answers. We now need to find out why telomere length is relatively short in early development. Our next steps are looking at single sperm and eggs to work out where the telomere length in early embryos is coming from."

Provided by University of Warwick