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Fluorescence-Based Ratiometric Analysis of Sperm Centrioles - a method to diagnose male infertility

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Abstract:
A large proportion of infertility and miscarriage causes are unknown. One potential cause is a defective sperm centriole, a subcellular structure essential for sperm motility and embryonic development. Yet, the extent to which centriolar maladies contribute to male infertility is still being determined due to the lack of a convenient way to assess centriole quality. We developed a robust, location-based, ratiometric assay to overcome this roadblock, the Fluorescence-based Ratiometric Assessment of Centrioles (FRAC). We performed several pilot studies suggesting that reduced centriole quality was associated with infertility and, in particular, with unexplained infertility in humans and unexplained sub-fertility in bovines. We also found that centriole quality correlates with zygote nucleoli polarization. These findings suggest that FRAC is a sensitive method to identify unexplained infertility and potentially also miscarriage. This finding provides a rationale for a large study on the role and practical application of sperm centriole evaluation to diagnose infertility.

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