VISIONS: THE ART OF SCIENCE

The path of the sperm to the oocyte†

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Not long ago, the zona pellucida of the egg was broadly accepted as the main trigger of the acrosomal exocytosis. Recent evidence, however, demonstrated that most fertilizing mouse sperm undergo acrosomal exocytosis before binding to the zona pellucida of the eggs (Jin et al, 2011. *PNAS*; doi 10.1073/pnas.1018202108). These findings raised the question of where fertilizing spermatozoa initiate acrosome exocytosis (Buffone et al, 2014. *Biol Reprod*; doi 10.1095/biolreprod.114.117911).

By using real-time imaging of sperm inside the oviduct, we observed that mouse sperm that carries EGFP (green) in the acrosome and DsRed2 (red) in mitochondria (Nakanishi et al, 1999. *FEBS Lett*; doi 10.1016/S0014-5793(99)00433-0) do not initiate acrosome exocytosis close to or at the zona pellucida; instead, a significant proportion of sperm undergo the acrosome reaction in the upper segments of the oviductal isthmus (La Spina et al, 2016. *Dev. Biol*; doi 10.1016/j.ydbio.2016.02.006). In this image, sperm are migrating in the lower isthmus of the oviduct after mating (also considered the sperm reservoir). Determination of the precise sperm location within the oviduct is greatly facilitated by the DsRed2 fluorescence of the flagella, which are clearly visible through the thin oviductal walls. Most sperm in the lower segments of the oviduct are acrosome-intact (as judged by the presence of EGFP in their acrosomes). The bright field image corresponds to this section of the lower segment of the oviduct isthmus.