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POST MEIOTIC GENE TRANSCRIPTS – SENSE, ANTISENSE, OR NONSENSE

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The mature spermatid is a highly specialised cell type whose structure and physiology have evolved to convey a haploid genome intact through a relatively inimical environment to find, interact with and achieve fertilisation of a mature female gamete, thus to produce a healthy diploid embryo. It is logical to assume that these highly specialist functions are the product of a unique set of genes or transcripts, expressed in late germ cell stages. It is equally logical to see the protein products of these genes as likely targets for a post meiotic approach to male contraception. Indeed many such spermatocyte- and spermatid-specific transcripts have been identified by differential cloning approaches. Some transcripts appear to represent novel sperm-specific genes, some represent sperm-specific alternative splice products, or alternatively initiated transcripts. However, for many such transcripts, there are features that lend doubt to the notion that they are truly functional in the context of sperm physiology. Many transcripts derive from undefined, TATA-less promoters. Some gene products have no legible open reading frame. Some transcripts are even produced as antisense molecules. Some appear as functional transcripts, but are not translated. Some appear to be highly species specific. Some appear to be functionally redundant, when tested in gene ablation experiments. The male gamete is under extreme selection pressure. It is therefore plausible that these apparently aberrant transcripts may have a function beyond that of conventionally generating physiologically relevant proteins, as in most somatic cells. This presentation reviews current ideas about the sperm transcriptome and presents various hypotheses to help us understand the mechanisms and purpose of post meiotic gene expression.

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