

## Chromatin mediated reprogramming of the male gamete

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How large-scale changes in chromatin structure mediate the expression of our genome remains an enigma. Far less is known about the transcriptionally inert male gamete. In part this reflects the condensed state of the once active sperm genome by the small basic protamine proteins. The male haploid-specific-expressed protamine locus has provided platform to build testable models to probe the structural and mechanistic framework. Within the mature human spermatozoon the locus presents as a single accessible chromatin loop domain. It adopts this conformation at the pachytene spermatocyte stage and remains in an exposed form even when the nuclear volume has been reduced by 13 fold. As the cell is reprogrammed contrasting dynamic nuclear matrix interactions are apparent. This resolves through the formation of the chromatin loop, initiated through a series of relaxases, of which, Topoisomerase II, a nuclear matrix associated activity has been characterized. Interestingly, a population of spermatozoal RNAs is maintained within this nuclear structure. These RNAs delivered at fertilization provide an essential component to early development that may act as genetic and epigenetic effectors to the fetal onset of adult disease.

### Biography

Dr. Stephen A. Krawetz is the Charlotte B. Failing Professor of Fetal Therapy and Diagnosis, serving as Associate Director of the C.S. Mott Center for Human Growth and Development in the Department of Obstetrics and Gynaecology and Center for Molecular Medicine and Genetics, Wayne State University School of Medicine, Detroit, Michigan. He is the founding Editor-in-Chief of Systems Biology in Reproductive Medicine. He received his Ph.D. in Biochemistry from the University of Toronto in 1983 and then trained with Gordon Dixon at The University of Calgary as an AHFMR postdoctoral fellow. Dr. Krawetz is well-recognized in the fields of Reproductive Genetics and Bioinformatics having published over 192 articles, reviews and chapters as well as serving as editor for several books.

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