

TARGETS OF THE ACTION OF NUCLEAR TRANSPORT FACTORS IN SPERMATOGENESIS

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During spermatogenesis, precise and orderly switches in gene expression are required. The movement of transcription factors (TFs) and nuclear proteins into and out of the nucleus is highly regulated, thus determining the extent and timing of gene expression. Most nuclear transport events are mediated by members of the importin superfamily that specifically recognise their cargoes and facilitate the passage of receptor-substrate complexes through the nuclear pore complex (NPC) which is made up of nucleoporin proteins. Eight human importin α isoforms are known that function in heterodimeric form with importin β whilst there are 20 members of the importin β family, which mediate the nuclear import or export of a very diverse set of protein or RNA cargoes. Understanding of importin and TF/chromatin component interaction during spermatogenesis should identify potential developmental switches, critical steps in the spermatogenic process. We are interested in the expression of different importins during spermatogenesis, and their specific nuclear import/export substrates as candidates in developmental switches. Preliminary analysis has shown that the nuclear import factors importin β 1 and 3 are not only expressed in germ cells, but also alter their cellular distribution during maturation. In a yeast two-hybrid screen, using truncated importin β 3 as bait and a library made from adult mouse testis, we identified a transcriptional repressor gene involved in cell cycle regulation, and an enzyme of the purine nucleotide biosynthesis pathway as candidate binding partners. Further studies will focus on elucidating the biological significance of these interactions in spermatogenesis.