

Abstract

Acephalic sperm syndrome (ASS) is a rare form of teratozoospermia that is probably genetic in origin. The sperm of individuals with this syndrome have a damaged apparatus connecting the head and flagellum (HTCA), which leads to the formation of acephalic sperm, i.e. sperm with separate heads from flagella. Individuals affected by ASS are almost exclusively infertile. One of the proteins whose mutation causes ASS is SUN5. Together with KASH proteins, SUN proteins are part of the so-called LINC complex, which ensures the connection of the nucleoskeleton with the cytoskeleton. Centrobin is a protein involved in centriole duplication and assembly of the dividing spindle. Rats carrying a defective gene for centrobin have reduced fertility and exhibit an ASS phenotype. For that reason, this model organism was used in this work to study the possible interrelationships of proteins involved in the formation of ASS. Given the similar phenotype of centrobin and SUN5 mutated spermatozoa, there is a possibility that centrobin interacts with one of the LINC complex proteins and together they participate in the formation of the head-flagella junction. Sperm from rats with a defective centrobin gene also show significant damage to the flagella. Decreased Odf1 protein expression has previously been reported in ASS patients, and Odf1-deficient male mice are infertile by decapitation. In this work, we therefore also focused on the possible relationship between centrobin and Odf1. Using the indirect immunofluorescence method, we detected differences in Odf1 protein localization in healthy sperm and sperm carrying a centrobin gene mutation. This work also includes the detection of the localization and distribution of centrobin in individual stages of male gamete development and cross-species comparison of the localization of centrobin, acetylated α -tubulin and Odf1 in spermatozoa and in the testes of male rats and mice. Using co-immunoprecipitation of lysates from the transfected HEK293T cell line, the nesprin1 protein was found as a suitable candidate for centrobin binding.