

The Characterization of Human Sperm Protein 17

ABSTRACT

Sperm protein 17 (Sp17) is a presumed testes specific autoantigenic protein whose known function is to bind sperm to the zona pellucida. The human Sp17 was first described as a spliced cDNA, however, sequence analyses revealed inconsistencies in the Sp17 nucleotide sequence. Moreover, the Sp17 gene was detected in non-testes tissues and highly proliferating cells, such as rheumatoid arthritis and malignant neoplasias.

These experiments elucidated the complete human Sp17 nucleotide sequence and examined Sp17 mRNA and protein distribution in normal and neoplastic tissues. A modified human Sp17 cDNA sequence was identified by RT-PCR, 5' RLM-RACE, 3' RACE PCR and sequence analyses. The newly proposed intron-containing Sp17 sequence was characterized by alternative transcriptional start sites (Sp17-1a and Sp17-1b) and multiple polyadenylation sites. In addition, an intronless Sp17 gene variant, Sp17-2, was identified in human genomic DNA by PCR and southern blot analysis. Sequence analysis of Sp17-2 revealed features of retroposition, suggestive of a non-functional pseudo-gene that may have evolved recently.

The primate was used as a non-human model to study the tissue distribution of the Sp17-1 transcript and to detect the Sp17-2 gene in genomic DNA. In addition, the Sp17 protein was examined by western blot analysis using rabbit anti-recombinant Sp17 polyclonal antibodies. Anti-recombinant Sp17 immune reactivity against concentrated recombinant Sp17 protein was preliminarily analyzed by ELISA and dot blot analyses. Although, the Sp17-1 transcript was detected in multiple normal non-testes tissues, including esophagus, kidney, pancreas and spleen, Sp17 mRNA and protein was not observed in non-testes tissues.

Sp17 was also examined in multiple cancer cell lines. The Sp17-1 transcript was detected in cancer cells by RT-PCR. Similarly, Sp17-2 was amplified from both cDNA and genomic DNA templates. Moreover, Sp17 mRNA was detected in multiple cancer cell lines by northern blot analysis. However, the Sp17 protein was not detected by western blot analysis.

The detection of the Sp17-1 transcript in normal non-testes and cancer tissues suggests an additional role for Sp17 in highly proliferating cells. In particular, the detection of Sp17 mRNA in normal testes and cancer cells, as compared to normal non-testis tissues, implicates Sp17 as a potential cancer-testis antigen.