

Cloning and sequencing of a mouse embryonal carcinoma cell mRNA encoding the tissue specific RNA splicing protein SmN

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Both we (1) and others (2) have reported the detection of a tissue specific protein SmN which is a component of the spliceosome that mediates the splicing of mRNA precursors and is expressed in only a limited number of tissue and cell types. This protein is closely related to the SmB and B′ splicing proteins which are expressed in all cell types (1, 3). However, SmN is encoded by a different gene to that encoding SmB and B′ (3, 4) and is the first example of a tissue specific RNA splicing protein.

Expression of the gene encoding SmN is regulated during embryonic development, the SmN mRNA and protein being detectable in embryonic stem cells and embryonal carcinoma cells but being repressed upon differentiation (5). Interestingly the SmN mRNA and protein reappear in adult brain and heart tissue but are absent in other adult tissues (1–3).

Although the sequence of cDNA clones derived from both rat and human brain mRNA has been published (2, 3) that of mouse SmN cDNA clones has not been reported whilst no cDNA clones derived from the SmN mRNA present in embryonic mRNA have been characterized at the DNA sequence level.

We have used an antibody to SmN (6) to isolate SmN cDNA clones from the mouse embryonal carcinoma cell line PCC4 (5). DNA sequence analysis of these clones (Figure 1) indicates that they are over 97% similar at the nucleotide level to the rat brain cDNA sequence (reference 3: 18 differences out of 765 nucleotides in the coding region) and encode the identical amino acid sequence. This strongly suggests that a single gene encodes the embryonic and brain forms of SmN, this gene being repressed as embryonic stem cells differentiate and reactivate during brain development. Similarly the strong similarity of this mouse sequence to the rat sequence and to the human brain SmN cDNA sequence (reference 3: over 90% similarity at the nucleotide level and 100% identity in the encoded amino acids) indicates the evolutionary conservation of SmN and suggests it has an important functional role probably in the regulation of alternative mRNA splicing in the cells which contain it.

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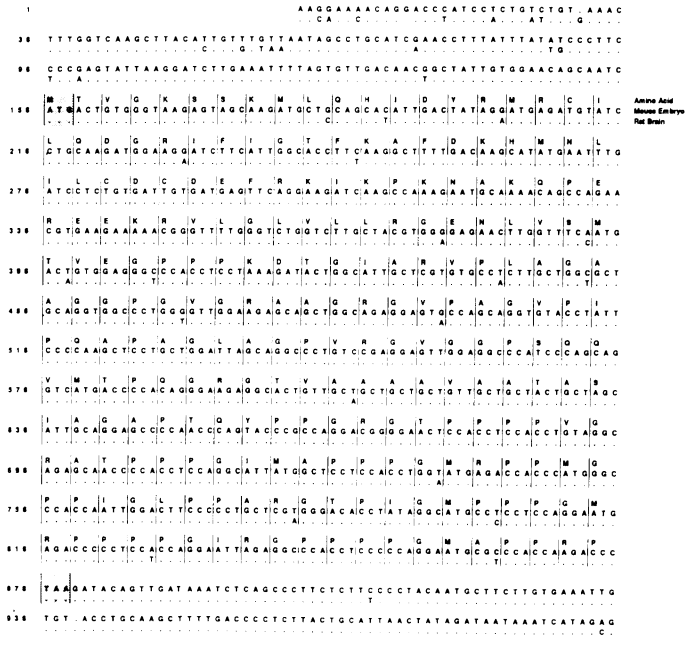

Sequence of the mouse embryonal carcinoma cDNA clone for SmN compared to the rat brain SmN cDNA sequence (3).

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