The human Oct-6 POU transcription factor lacks the first 50 amino acids of its murine counterpart

Andreas Tobler, Edgar Schreiber and Adriano Fontana
Section of Clinical Immunology, Department of Internal Medicine, University Hospital Zurich, Haeldeliweg 4, CH 8044 Zurich, Switzerland

Received November 27, 1992; Revised and Accepted January 12, 1993 EMBL accession no. Z18284

Oct-6 is a POU domain transcription factor expressed in embryonal and neural tissues. Sequences for this protein were previously reported from mouse ES cells, termed Oct-6 (1, 2), rat Schwann cells, termed SCIP (3) and rat testes, termed Tst-1 (4). Expression of Oct-6 was shown to be downregulated during embryonic stem cell differentiation and upregulated again in glia progenitor cells of the central and peripheral nervous system (1). Oct-6 expression in peripheral glia progenitor cells occurs only immediately before their development into myelin-forming cells. This period is characterized by a high proliferation rate and the repression of myelin-specific gene expression; both observations are thought to be due to an elevated expression of Oct-6 (3).

In our laboratory we are investigating POU factors specific for the nervous system. We screened a human fetal brain ZAP II cDNA library with radiolabelled POU domain DNA fragments of the human oct-2 cDNA and murine oct-6 cDNA. Positive plaques were subcloned to Bluescript plasmids. The cDNAs encoding octamer DNA binding proteins were identified by *in vitro* transcription/translation followed by EMSA. Two positive clones encoded a protein migrating slightly faster than mouse Oct-6 (data not shown). We determined the nucleotide sequence of 1733 bp Oct-6 cDNA by sequencing according to the method of Sanger using the Sequenase 2.0 (USB) enzyme.

An open reading frame of 1194 nucleotides was identified. The putative protein contains 398 amino acids. This sequence corresponds to the amino acids 51–449 of mouse Oct-6 with a homology of 98.8% at the amino acid level and 94.2% at the nucleotide level. The first 30 nucleotides of the 5′ untranslated sequence of the human Oct-6 cDNA are well conserved to corresponding coding sequences of the mouse Oct-6 protein, but further upstream there is no more sequence homology (Figure 1). There is also no homology between the 5′ untranslated sequences of the mouse and human Oct-6 cDNAs.

Five amino acids in the human protein are different and, at position 33, one amino acid is absent compared to mouse Oct-6. Four differences are located at the amino terminus and one at the carboxy terminus, whereas the POU domain of the two proteins are identical.

The human Oct-6 protein activates transcription from an octamer–TATA minimal promoter (data not shown) despite lacking the first 50 amino acids compared to the mouse Oct-6 protein. This finding is compatible with the mapping of the activation domain in the mouse Oct-6 protein. Deletion of the first 44 amino acids slightly reduced the activating properties of the mouse Oct-6 protein (5).

ACKNOWLEDGEMENT

This work was supported by the Swiss National Science Foundation (Project 31-28402.90).

REFERENCES

1. Suzuki,N., Rohdewohld,H., Neuman,T., Gruss,P. and Schöler,H.R. (1990) *EMBO J.* **9**, 3723–3732.
2. Meijer,D., Graus,A., Kraay,R., Langeveld,A., Mulder,M.P. and Grosveld,G. (1990) *Nucleic Acids Res.* **18**, 7357–7365.
3. Monuki,E.S., Kuhn,R., Weinmaster,G., Trapp,B.D. and Lemke,G. (1990) *Science* **249**, 1300–1303.
4. He,X., Gerrero,R., Simmons,D.M., Park,R.E., Lin,C.R., Swanson,L.W. and Rosenfeld,M.G. (1991) *Mol. Cell Biol.* **11**, 1739–1744.
5. Meijer,D., Graus,A. and Grosveld,G. (1992) *Nucleic Acids Res.* **20**, 2241–2247.

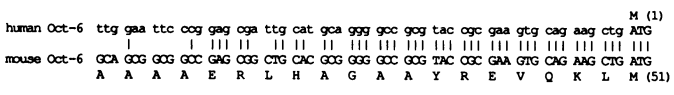

Figure 1. Comparison of the human Oct-6 cDNA 5′ untranslated sequence with the corresponding mouse Oct-6 cDNA coding sequence. The human 5′ untranslated sequence is shown in lowercase, whereas coding sequences are shown in uppercase.