The mRNA of a human class I gene HLA G/HLA 6.0 exhibits a restricted pattern of expression

Hridayabhiranjan Shukla, Anand Swaroop*, Rakesh Srivastava¹ and Sherman M. WeissmanDepartment of Human Genetics, P.O. Box 3333, Yale University School of Medicine, New Haven, CT 06510 and ¹Department of Immunology, Research Institute of Scripps Clinic, La Jolla, CA 92037, USA

Submitted December 6, 1989

EMBL accession no. X17273

Molecular analysis of the human major histocompatibility complex region has identified three largely intact genes (HLA E, HLA 5.4 and HLA 6.0) for nonclassical class I transplantation antigens (1). Although gene transfer results suggest that the relatively non-polymorphic gene HLA 6.0 can potentially encode a class I polypeptide (2), expression of the mRNA from the chromosomal gene is not reported. We isolated the cDNA clone ASR53 for HLA 6.0 (HLA G) from a human fetal eye (11 week) cDNA library. The nucleotide sequence is identical to that predicted by HLA 6.0 genomic sequence except for the absence of exon 7, and confirms an in-frame termination codon in exon 6 (Fig. 1). HLA G mRNA is present in fetal eye tissue and cells, and at low levels in fetal thymus (Fig. 2). No signal for the mRNA is detected in spleen and B-cell derived lymphoblastoid cells which express relatively high levels of other class I genes. It remains to be determined if the in-frame translation termination is related to the aberrant splicing and lack of detectable expression in most tissues and cells. The restricted expression of HLA G is of interest for ocular immunity.

```
CAAGGATGGTGTCTATGGGCGCCGGAACCTCTTCTGCTCTGCGGGGCGCTGACCGAGACTGGGGGGCTCCCACTCA 90
H V V H A P R T L F L L L S G A L T L T E T W A G S H S H
TGAGGTATTTTCAGCGCGCGCTGTCGCGGCGCGCGCGCGCGCTTCATGCGCATGGCTACCTGACGACAGCAGTCTGTC 180
R Y F S A A V S R P R G R G E P R F I A N G Y V D D T Q F V R
GGTTGACAGCAGCTCGCGCTGTCTGGAGGATGAGCGCGCGCGCGCGCTGGTGGAGGCGCGCGAGTATTTGGAGAGAGGACAC 270
F D S D S A C P R H E P R A P W V E Q E G P E Y W E E E T R
GGACACCAAGCGCGCGAGAGCTGACGATGACCTGACGAGCGCGCGCGCTACTACACAGAGCGAGCGCGAGTCTCACACCC 360
N T K A H A Q T D R M N L Q T L R G Y Y N Q S E A S S H T L
TCCAGTGTATGATGGCTGCGGCTGCGGCTGCGGCGCGCGCTCTCTCTCGCGGTATGACAGTATGCGTACGATGGCGAGGATTA 450
Q W H I G C D L G S D G R L L R G Y E Q Y A Y D G R D Y L A
CCCTGACAGGAGCTGCGGCTGCGGCGCGCGAGCGAGCTGCGGCTCAGATCTCCAGCGCGAGTGTGAGCGCGCGAGTGTGCTGAC 540
L N E D L R S W T A A D T A A Q I S K R K C E A A N V A E Q
AAAGGAGAGCGCTGAGCGCGAGCTGCGGCTGCGGCTGCGGCTGCGGCTGCGGCTGCGGCTGCGGCTGCGGCTGCGGCTGCGGCT 630
R R A Y L E G T C V E W L H R Y L E N G R E H L Q R A D P F
CCAGACACAGCTGACCGACCGCTGCTTTGACTATGAGCGCACCTGAGGTGCTGGGCGCTGGGCTCTACCGTGGGAGATCATAC 720
K T H V T H H P V F D Y E A T L R C W A L G F Y P A E I I L
TGACCTGGCGCGGATGGGAGGAGCGAGCGAGCGAGCTGAGCTGAGCGAGCGAGCGAGCGAGCGAGCGAGCGAGCGAGCGAGCG 810
T W Q R D G E D Q T Q D V E L V E T R P A G D G T F Q R W A
CAGCTGTGGTGGCTCTGAGAGGAGAGAGATACCGTGCATGTGACAGTATGAGGCGCTGCGGCGCGCTCATGCTGAGATGGA 900
A V V V P S G E E Q R Y T C H V Q H E G L P E P L M L R W K
AGCAGTCTTCTCCCTGCGACATCCCATCGGATGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCTGCT 990
Q S S L P T I P I N G I V A G L V L A A V V T G A A V A A
CTGTGCTGTGGAGAGAGAGCTGAGTGAAGAGGAGGAGCTCTCTCAGGCTGCAATGTGAAGAGCTGCCCTGTGTGGAGCTGAG 1080
V L W R K E S D * 53.2
TGGCAGTCCCTTTGTGATTTCAAGACCTGACTTCTCTTTGTGCGAGAGACGACCCACCGCTGTGCCACCATGACCTCTTCTCAT 1170
GCTGAGTGCATCTCTCCCGATGACCTTCTCTGTTCCAGAAAGGGGCTGGAGTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCT 1260
AGCTATGATCTACTCTGTATTAATTAATGATCTGATTAATAAAAAAAAAA 1315
```

Figure 1. Complete nucleotide sequence of ASR53 (HLA G) cDNA. The underlined and boxed regions with arrows indicate the specific oligonucleotides used for analysis of expression.

ACKNOWLEDGEMENTS

We wish to thank Dr David Bick (UTHSC, San Antonio) for fetal eye tissue, Dr. Satish Parimoo for spleen cDNA library DNA and Leif Madsen for excellent preparation of the text. This work was supported by grants-in-aid from the National Society to Prevent Blindness and Fight for Sight, New York City, and EY07961 (AS), CA47519 and AI26334 (RS), and CA42556 (SMW) from NIH.

REFERENCES

1. Orr, H.T. (1989) In *Immunology of HLA* vol. II (B. Dupont, ed.) Springer Verlag, New York, pp. 33–40.
2. Simizu *et al.* (1988) *Proc. Natl. Acad. Sci. USA* **85**, 227–231.

Figure 2. The 53.1 and 53.2 primers were used to amplify DNA from several human tissue and cell line cDNA libraries (as indicated) by the polymerase chain reaction. The products were fractionated by gel electrophoresis, transferred to a nylon membrane and probed with a ³²P-labelled oligonucleotide specific for ASR53 (6.27, Fig. 1). 1) Adult retina, 2) Fetal eye, 3) Fetal brain, 4) Fetal thymus, 5 and 6) Teratocarcinoma cell line NTera2/D1, 7) JY lymphoblastoid cell line, 8) Eye cells HS738 from ATCC, 9 and 10) Spleen.

* To whom correspondence should be addressed