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LETTER TO THE EDITOR

Nomenclature for Human Homeobox Genes

To the Editor:

The basic principle of using *Hox* as the root of the symbols for homeobox genes in the mouse and designating the different clusters of homeobox genes with Arabic numerals as described by Martin *et al.* (1987) and endorsed by Lyon (1987) was adopted for the human gene map, with the proviso that the human gene symbols be written in uppercase letters (i.e., *HOX*). In both species the same numerical designation is used to identify cognate gene clusters so that relatedness is reflected in the terminology. However, the request that individual members of each cluster be identified with a decimal fraction cannot be accepted for the human homeobox genes, as the Guidelines for Human Gene Nomenclature preclude the use of punctuation in human gene symbols (Shows *et al.*, 1987). Consequently, the Nomenclature Committee of the Human Gene Mapping Workshops recommends that individual members of the HOX gene clusters in humans be designated by the uppercase letter corresponding to the numeral of the decimal fraction used for the mouse, as shown below.

Human designation	Mouse designation
HOX1A	*Hox-1.1*
HOX1B	*Hox-1.2*
HOX2A	*Hox-2.1*
etc.	etc.

As a result of the new data presented in this issue of *Genomics* (Stubbs *et al.*, 1990), it is requested that the following system for gene nomenclature of the human HOX genes mapping to 2q31–q32 be utilized. Such a system will ensure uniformity of human gene nomenclature.

Human designation		Mouse designation
Symbol	Previous symbol	(according to Stubbs *et al.*)
HOX4A	*HOX4A*	*Hox-4.1*
HOX4B	*HOX4B*	*Hox-4.2*
HOX4C	*HOX4E*	*Hox-4.3*
HOX4D	*HOX4C*	*Hox-4.4*
HOX4E	*HOX4D*	*Hox-4.5*
HOX4F	*HOX4F*	*Hox-4.6*
HOX4G		*Hox-4.7*

On the basis of this new evidence of Stubbs *et al.*, it will be necessary to reassign the human gene symbols *HOX4C, HOX4D,* and *HOX4E*. In these exceptional circumstances we believe that recognizing the new relationships warrants the gene symbol changes noted above. It is requested that authors identify HOX genes with the new human terminology while including the previous terminology in parentheses to facilitate these changes.

REFERENCES

1. LYON, M. F. (1987). Nomenclature for homeo-box containing genes. *Nature (London)* **325:** 22.
2. MARTIN, G. R., BONCINELLI, E., DUBOULE, D., GRUSS, P., JACKSON, I., KRUMLAUF, R., LONAI, P., MCGINNIS, W., RUDDLE, F., AND WOLGEMUTH, D. (1987). Nomenclature for homeo-box containing genes. *Nature (London)* **325:** 21–22.
3. SHOWS, T. B., MCALPINE, P. J., BOUCHEIX, C., CAHILL, G. F., JR., COLLINS, F. S., CONNEALLY, P. M., FREZAL, J., GERSHOWITZ, H., GOODFELLOW, P. N., HALL, J. G., ISSITT, P., JONES, C. A., KNOWLES, B. B., LEWIS, M., MCKUSICK, V. A., MEISLER, M., MORTON, N. E., RUBINSTEIN, P., SCHANFIELD, M. S., SCHMICKEL, R. D., SKOLNICK, M. H., SPENCE, A. M., TRAVER, M., VAN CONG, N., AND WILLARD, H. F. (1987). Guidelines for Human Gene Nomenclature: Ninth International Workshop on Human Gene Mapping. *Cytogenet. Cell Genet.* **46:** 11–28.
4. STUBBS, L., POUSTKA, A., BARON, A., LEHRACH, H., LONAI, P., AND DUBOULE, D. (1990). The murine genes *Hox-5.1* and *Hox-4.1* belong to the same HOX complex on chromosome 2. *Genomics* **7:** 422–427.

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