

CD Nomenclature

CD Molecules

CD (cluster of differentiation) antigens are cell-surface molecules expressed on leukocytes and other cells relevant for the immune system. CD nomenclature has been universally adopted by the scientific community, and is officially approved by the International Union of Immunological Societies (IUIS) and sanctioned by the World Health Organization (WHO). It provides a unified designation system for monoclonal antibodies (mAbs), as well as for the cell-surface molecules they recognize. This nomenclature has been established by the Human Leukocyte Differentiation Antigens (HLDA) Workshops.

CD stands for cluster of differentiation. A non-descriptive cluster of differentiation number (CD followed by a number) is assigned to a group or cluster of mAbs that recognize the same cell surface molecule (e.g. CD2 or CD3). The CD designation refers to a group of mAbs shown by the statistical method of cluster analysis to recognize a particular cellular differentiation pattern. The CD nomenclature is also used to name the molecule itself. For example, CD4 designates both the group of mAbs recognizing the CD4 cell surface molecule as well as the CD4 molecule itself.

A lowercase "w" preceding the number designation stands for "workshop" (e.g., CDw12), and indicates that the CD designation is tentative; it denotes an insufficiently characterized antibody or molecule. In some cases, it corresponds to a molecule defined by only one antibody submitted to the HLDA workshops.

In other cases, lowercase letters have been used to name different members of the same gene family, as is the case with CD66. With regard to carbohydrate CD structures, a lower case

suffix represents a modification of the same carbohydrate sequence, e.g. for CD15.

Uppercase letters following a CD number designate a spliced variant of the extracellular domain of a cell surface molecule. For example, CD45RA or CD45R0 corresponds to splice variants of CD45. A lowercase letter following the CD number (e.g., CD1a, CD1b, CD1c, CD1d or CD1e) indicates several molecules that share a common chain.

In the past, an uppercase letter was added to some CDs to group related molecules under the same CD number. This was the case for selectins: CD62L (L-selectin), CD62E (E-selectin) and CD62P (P-selectin). To avoid confusion with the incorrect notion that “L” represents “ligand”, the addition of uppercase “L” has been discontinued.

A list of the proceedings and references of the different HLDA conferences and a database with mAbs that have been approved by the HLDA Workshops are listed at www.HCDM.org.

HLDA workshops

| Workshop | | CDs assigned | Number of CDs assigned | |
|----------|------------------|--------------|------------------------|----|
| # | City | Year | | |
| I | Paris, FR | 1982 | CD1-CDw15 | 15 |
| II | Boston, MA, USA | 1984 | CD16-CDw26 | 11 |
| III | Oxford, UK | 1987 | CD27-CD45 | 19 |
| IV | Vienna, AT | 1989 | CD46-CDw78 | 33 |
| V | Boston, MA, USA | 1993 | CD79-CDw109 | 31 |
| VI | Kobe, JP | 1996 | CD110-CD166 | 55 |
| VII | Harrogate, UK | 2000 | CD167-CD247 | 81 |
| VIII | Adelaide, SA, AU | 2004 | CD248-CD339 | 93 |

| Workshop | | | CDs assigned | Number of CDs assigned |
|----------|---------------------|------|--------------|------------------------|
| IX | Barcelona, ES | 2009 | CD340-CD364 | 25 |
| X | Wollongong, NSW, AU | 2014 | CD365-CD371 | 7 |

Further reading

1. [Clark, H. Stockinger, R. Balderas, M.C. van Zelm, H. Zola, D. Hart, P. Engel \(2016\) Nomenclature of CD molecules from the Tenth Human Leucocyte Differentiation Antigen Workshop. Clin Transl Immunology. 5\(1\):e57.](#)
2. [Engel, L. Boumsell, R. Balderas, A. Bensussan, V. Gattei, V. Horejsi, B.Q. Jin, F. Malavasi, F. Mortari, R. Schwartz-Albiez, H. Stockinger, M.C. van Zelm, H. Zola, G. Clark \(2015\) CD Nomenclature 2015: Human Leukocyte Differentiation Antigen Workshops as a Driving Force in Immunology. J Immunol. 195\(10\):4555-63.](#)
3. Zola H, Swart, B, Nicholson I, Voss E. Leukocyte and Stromal Cell Molecules: The CD Markers. Wiley-Liss, 2007. ISBN-13:978-0-471-70132-3
4. hcdm.org