# DC subtypes and reference sequences

## DC8

Definition

DBLa2-CIDRa1.1-DBLb12-DBLg4/6-x (Rask et al 2010 PLOS Comp Bio)

with some HBEC-binding/rosetting variants having DBLa1.2 instead of DBLa2 and CIDRa1.8 instead of CIDRa1.1

Reference sequences

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Domain architecture** | **Phenotype** | **Reference** |
| TM180var1 | DBLa2-CIDRa1.8-DBLb12-DBLg4-DBLd1-CIDRb5 | rosetting | Ghumra et al 2012 PLOS Pathogens |
| IT4var06 / IT4-020027600 | DBLa2-CIDRa1.1-DBLb12-DBLg6-DBLd1-CIDRb4 | HBEC/EPCR-binding | Turner et al 2013 Nature |
| IT4var19 / IT4-010005000 | DBLa2-CIDRa1.1-DBLb12-DBLg6-DBLd1-CIDRb1-DBLg9 | HBEC/EPCR-binding | Turner et al 2013 Nature  Claessens et al 2012 PNAS |
| IT4var20 / IT4-070017000 | DBLa2-CIDRa1.1-DBLb12-DBLg6-DBLd1-CIDRb6 | HBEC/EPCR-binding | Turner et al 2013 Nature |
| PFD0020c / 3D7-0400400 | DBLa1.2-CIDRa1.1-DBLb12-DBLg6-DBLg11-DBLd1-CIDRg8 | HBEC/EPCR-binding | Turner et al 2013 Nature  Claessens et al 2012 PNAS |

Subtypes (provisional)

|  |  |  |
| --- | --- | --- |
| **Subtype name** | **Domain architecture** | **Notes** |
| DBLa2-CIDRa1.1 head with DBLg4 | DBLa2-CIDRa1.1-DBLb12-DBLg4-x |  |
| DBLa2-CIDRa1.8 head with DBLg4 | DBLa2-CIDRa1.8-DBLb12-DBLg4-x | TM180var1-like |
| DBLa2-CIDRa1.1 head with DBLg6 | DBLa2-CIDRa1.1-DBLb12-DBLg6-x | IT4var06-like  IT4var19-like  IT4var20-like |
| DBLa2-CIDRa1.8 head with DBLg6 | DBLa2-CIDRa1.8-DBLb12-DBLg6-x |  |
| DBLa1.2-CIDRa1.1 head with DBLg6 | DBLa1.2-CIDRa1.1-DBLb12-DBLg6-x | PFD0020c-like |
| DBLa1.2-CIDRa1.1 head with DBLg4 | DBLa1.2-CIDRa1.1-DBLb12-DBLg4-x |  |
| DBL undefined | CIDRa1.1/CIDRa1.8-DBLb12-x |  |
| other | other |  |

## DC13

Definition

DBLa1.7-CIDRa1.4-x (Rask et al 2010 PLOS Comp Bio)

Reference sequences

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Domain architecture** | **Phenotype** | **Reference** |
| HB3var03 / HB3-130080100 | DBLa1.7-CIDRa1.4-DBLb3-DBLg12-DBLd5-CIDRb3-DBLb7 | HBEC/EPCR-binding | Turner et al 2013 Nature  Claessens et al 2012 PNAS |
| IT4var07 / IT4-060036700 | DBLa1.7-CIDRa1.4-DBLb1-DBLb3-DBLg10-DBLd1-CIDRb1 | HBEC/EPCR-binding | Turner et al 2013 Nature  Claessens et al 2012 PNAS |
| DD2var32 / Dd2-040005100 | DBLa1.7-CIDRa1.4-DBLb1-DBLb6-DBLg11-DBLd1-CIDRg5 | HBEC/EPCR-binding | Turner et al 2013 Nature |
| PF11\_0521 / 3D7-1150400 | DBLa1.7-CIDRa1.4-DBLb3-DBLb6-DBLd3-CIDRg2 | HBEC/EPCR-binding | Turner et al 2013 Nature |

Subtypes (provisional)

|  |  |  |
| --- | --- | --- |
| **Subtype name** | **Domain architecture** | **Notes** |
| head structure with DBLb1 | DBLa1.7-CIDRa1.4-DBLb1-x | IT4var07-like  DD2var32-like |
| head structure with DBLb3 | DBLa1.7-CIDRa1.4-DBLb3-x | HB3var03-like  PF11\_0521-like |
| head structure with DBLg9 | DBLa1.7-CIDRa1.4-DBLg9-x |  |
| head structure with DBLg2 | DBLa1.7-CIDRa1.4-DBLg2-x |  |
| head structure with DBLb12 | DBLa1.7-CIDRa1.4-DBLb12-x |  |
| head structure with DBLz3/DBLa1.3\* | DBLa1.7-CIDRa1.4-DBLz3/DBLa1.3-x |  |
| head structure with DBLg11 | DBLa1.7-CIDRa1.4-DBLg11-x |  |
| Other | DBLa1.7-CIDRa1.4-x |  |

\*DBLz3 can be a hybrid form of DBLa1.3 (see Rask et al 2010 PLOS Comp Bio)

## DC15

Definition

DBLa1.2-CIDRa1.5-x (Rask et al 2010 PLOS Comp Bio)

Reference sequences

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Domain architecture** | **Phenotype** | **Reference** |
| 9197var15 / PC0053-C.g687 | DBLa1.2-CIDRa1.5-DBLg11-DBLd4-CIDRg9-DBLe13-DBLz5-DBLe4 | rosetting | McLean et al 2025 PLOS Pathogens |
| 9775.g448 / PFKE11.g448 | DBLa2-CIDRa1.1-DBLb12-DBLg6-DBLd1-CIDRb4 | rosetting | McLean et al 2025 PLOS Pathogens |

Subtypes (provisional)

|  |  |  |
| --- | --- | --- |
| **Subtype name** | **Domain architecture** | **Notes** |
| head structure with DBLb6 | DBLa1.2-CIDRa1.5-DBLb6-x | 9775.g448-like |
| head structure with DBLb3 | DBLa1.2-CIDRa1.5-DBLb3-x |  |
| head structure with DBLg12 | DBLa1.2-CIDRa1.5-DBLg12-x |  |
| head structure with DBLg2 | DBLa1.2-CIDRa1.5-DBLg2-x |  |
| head structure with DBLg17 | DBLa1.2-CIDRa1.5-DBLg17-x |  |
| head structure with DBLg7 | DBLa1.2-CIDRa1.5-DBLg7-x |  |
| head structure with DBLg11 | DBLa1.2-CIDRa1.5-DBLg11-x | 9197var15-like |
| head structure with DBLb7 | DBLa1.2-CIDRa1.5-DBLb7-x |  |
| head structure with DBLb1 | DBLa1.2-CIDRa1.5-DBLb1-x |  |
| head structure with DBLb12 | DBLa1.2-CIDRa1.5-DBLb12-x |  |
| head structure with DBLg10 | DBLa1.2-CIDRa1.5-DBLg10-x |  |
| head structure with DBLb9 | DBLa1.2-CIDRa1.5-DBLb9-x |  |
| head structure with DBLg14 | DBLa1.2-CIDRa1.5-DBLg14-x |  |
| Other | DBLa1.2-CIDRa1.5-x |  |

## DC16

Definition

DBLa1.5-CIDRd1/ DBLa1.5-CIDRd2-x or DBLa1.6-CIDRd1/ DBLa1.6-CIDRd2-x (Rask et al 2010 PLOS Comp Bio)

with some rosetting variants having a DBLa1.6-CIDRg3 or DBLa1.6-CIDRg6 head structure

Reference sequences

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Domain architecture** | **Phenotype** | **Reference** |
| HB3var06 / HB3-120045300 | DBLa1.5-CIDRd1-DBLg6-DBLd2-CIDRg6-DBLe13-DBLz2-DBLe14 | rosetting | Ghumra et al 2012 PLOS Pathogens |
| IT4var09|IT4-130005300 | DBLa1.6-CIDRg3-DBLg15-DBLe1-DBLd1-CIDRb1 | rosetting | Rowe et al 1997 Nature |
| PF13\_0003|3D7-1300300 | DBLa1.6-CIDRd1-DBLb3-DBLg12-DBLd5-CIDRb3-DBLb9 | rosetting | Vigan Womas 2011 PLOS One |
| Muz12var1 | DBLa1.5-CIDRd1-DBLb12-DBLg11-DBLd1-CIDRb1 | rosetting | Ghumra et al 2012 PLOS Pathogens |
| varO / Palo Alto varO | DBLa1.6-CIDRg6-DBLb7-DBLg14-DBLz5-DBLe4 | rosetting | Vigan Womas 2008 Infection and Immunity |

Subtypes (provisional)

|  |  |  |
| --- | --- | --- |
| **Subtype name** | **Domain architecture** | **Notes** |
| DBLa1.6-CIDRd2 head with DBLb6 | DBLa1.6-CIDRd2-DBLb6-x |  |
| DBLa1.6-CIDRd1 head with DBLb6 | DBLa1.6-CIDRd1-DBLb6-x |  |
| DBLa1.6-CIDRg3 head with DBLg15 | DBLa1.6-CIDRg3-DBLg15-x | IT4var09-like |
| DBLa1.6-CIDRd1 head with DBLg12 | DBLa1.6-CIDRd1-DBLg12-x |  |
| DBLa1.5-CIDRd1 head with DBLg11 | DBLa1.5-CIDRd1-DBLg11-x |  |
| DBLa1.5-CIDRd1 head with DBLg12 | DBLa1.5-CIDRd1-DBLg12-x | Muz12var1-like |
| DBLa1.5-CIDRd1 head with DBLb3 | DBLa1.5-CIDRd1-DBLb3-x |  |
| DBLa1.6-CIDRd1 head with DBLb3 | DBLa1.6-CIDRd1-DBLb3-x | PF13\_0003-like |
| DBLa1.5-CIDRd1 head with DBLb6 | DBLa1.5-CIDRd1-DBLb6-x |  |
| DBLa1.5-CIDRd1 head with DBLb7 | DBLa1.5-CIDRd1-DBLb7-x |  |
| DBLa1.6-CIDRg3 head with DBLe1 | DBLa1.6-CIDRg3-DBLe1-x |  |
| DBLa1.6-CIDRg6 head with DBLg18 | DBLa1.6-CIDRg6-DBLg18-x |  |
| DBLa1.6-CIDRd1 head with DBLg4 | DBLa1.6-CIDRd1-DBLg4-x |  |
| DBLa1.6-CIDRg3 head with DBLb6 | DBLa1.6-CIDRg3-DBLb6-x |  |
| DBLa1.6-CIDRg3 head with DBLg12 | DBLa1.6-CIDRg3-DBLg12-x |  |
| DBLa1.6-CIDRg3 head with DBLg7 | DBLa1.6-CIDRg3-DBLg7-x |  |
| DBLa1.6-CIDRd1 head with DBLb7 | DBLa1.6-CIDRd1-DBLb7-x |  |
| DBLa1.6-CIDRg3 head with DBLg18 | DBLa1.6-CIDRg3-DBLg18-x |  |
| DBLa1.5-CIDRd1 head with DBLg2 | DBLa1.5-CIDRd1-DBLg2-x |  |
| DBLa1.6-CIDRd2 head with DBLb7 | DBLa1.6-CIDRd2-DBLb7-x |  |
| DBLa1.6-CIDRg3 head with DBLb7 | DBLa1.6-CIDRg3-DBLb7-x |  |
| DBLa1.6-CIDRg3 head with DBLb3 | DBLa1.6-CIDRg3-DBLb3-x |  |
| DBLa1.6-CIDRg3 head with DBLg11 | DBLa1.6-CIDRg3-DBLg11-x |  |
| DBLa1.6-CIDRd2 head with DBLg11 | DBLa1.6-CIDRd2-DBLg11-x |  |
| DBLa1.6-CIDRg6 head with DBLg15 | DBLa1.6-CIDRg6-DBLg15-x |  |
| other | other | HB3var06-like (DBLa1.5-CIDRd1-DBLg6 head structure)  varO-like  (DBLa1.6-CIDRg6-DBLb7 structure) |

Note:

I did not include DBLa1.5-CIDRg3 and DBLa1.5-CIDRg6 combinations because it would result in even more variants/potential subtypes

## DC11

Definition

DBLa1.8-CIDRb2-DBLg7-DBLe11-DBLz2/DBLz3-DBLe6 (Rask et al 2010 PLOS Comp Bio)

with some rosetting variants having a DBLa1.8-CIDRb2-DBLg7-DBLz5-DBLe11-DBLe12 or DBLa1.8-CIDRg3-DBLg7- DBLe11-DBLa1.3/DBLz3-DBLe8 domain structure

Reference sequences

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Domain architecture** | **Phenotype** | **Reference** |
| TM284var1 | DBLa1.8-CIDRb2-DBLg7-DBLe11-DBLz2-DBLe6 | rosetting | Ghumra et al 2012 PLOS Pathogens |
| 9605.g502 | DBLa1.8-CIDRb2-DBLg7-DBLe11-DBLz2-DBLe6 | rosetting | McLean et al 2025 PLOS Pathogens |
| IT4var60 | DBLa1.8-CIDRb2-DBLg7-DBLz5-DBLe11-DBLe12 | rosetting | Albrecht et al 2011 Malaria Journal |
| 11019var1 | DBLa1.8-CIDRg3-DBLg7-DBLe11-DBLz3-DBLe8 | rosetting | McLean et al 2025 PLOS Pathogens |

Subtypes

|  |  |  |
| --- | --- | --- |
| **Subtype name** | **Domain architecture** | **Notes** |
| TM284var1-like | DBLa1.8-CIDRb2-DBLg7-DBLe11-DBLz2-DBLe6 | TM284var1-like  9605.g502-like |
| DC11 domain architecture with a DBLz3 | DBLa1.8-CIDRb2-DBLg7-DBLe11-DBLz3-DBLe6 |  |
| IT4var60-like | DBLa1.8-CIDRb2-DBLg7-DBLz5-DBLe11-DBLe12 | IT4var60-like |
| 11019var1-like | DBLa1.8-CIDRg3-DBLg7-DBLe11-DBLz3/DBLa1.3-DBLe8 | 11019var1-like |

\*DBLz3 can be a hybrid form of DBLa1.3 (see Rask et al 2010 PLOS Comp Bio)

Note:

About 9% of variants express DBLa1.8-CIDRb2-DBLg7- with a different C-terminus (either a -DBLdx-CIDRx-DBLx-DBLx structure or a different structure ending in -DBLe3) and about 1% of the variants had a N-terminus-C-terminus combination not listed above (e.g. DBLa1.8-CIDRg3-DBLg7-DBLe11-DBLz2-DBLe6-). These were not included in the final dataset.