CDC20 (cell division cycle 20 homolog (S. cerevisiae))

Susanta Roychoudhury, Taraswi Banerjee, Somsubhra Nath

Human Genetics and Genomics Division, Indian Institute of Chemical Biology, Kolkata-700 032, India (SR, TB, SN)

Published in Atlas Database: April 2008

Online updated version: http://AtlasGeneticsOncology.org/Genes/CDC20ID40003ch1p34.html

DOI: 10.4267/2042/44399

This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 2.0 France Licence.

© 2009 Atlas of Genetics and Cytogenetics in Oncology and Haematology

### Identity

**Other names:** CDC20A; MGC102824; P55CDC-LSB; bA276H19.3; p55CDC  
**HGNC (Hugo):** CDC20  
**Location:** 1p34.1

### DNA/RNA

**Description**  
Start: 43,597,199 bp from pter.  
End: 43,601,461 bp from pter.  
Size: 4,262 bases.  
Orientation: plus strand.  
13 exons (Entrez), 15 Exons (Ensembl).

**Transcription**  
1697 bp.

**Pseudogene**  
No.

### Protein

**Description**  
Size: 499 amino acids; 54723 Da. Subunit: Interacts with MAD2L1. The phosphorylated form interacts with APC/C. Developmental stage: Synthesis is initiated at G1/S, protein level peaks in M phase and protein is abruptly degraded at M/G1 transition.

**Expression**  
It is expressed in all cells, no tissue specificity.

**Localisation**  
Nucleus.

**Function**  
CDC20 is a key player in the Spindle Assembly Checkpoint (SAC). When a cell is dividing mitotically, the Metaphase to Anaphase transition is stringently monitored by SAC. After proper alignment of all the sister chromatids to the spindle fibers during metaphase, the Mitotic Checkpoint Complex detaches from CDC20 and free CDC20 protein activates the Anaphase promoting Complex (APC). Activated APC can then degrade Securin which frees the protease Separase. Free Separase can now degrade the Cohesin molecules binding the two sister chromatids together. Upon degradation of Cohesin, the two sister chromatids are free and can migrate to the two spindle poles, thus, initiating Anaphase.

![Kinetochoore Binding, Mad2 Binding, APC Activation, WD40 repeat region](image)

The N-terminal amino acids from 1-153 contains most of the functional domains consisting of the Kinetochoore binding domain, Mad2 binding domain and the Anaphase promoting complex (APC) activation domain. Amino acids 129-499 contain the WD-repeat region.
**Homology**
The C-terminal half is highly conserved from humans to yeast.

**Mutations**

**Germinal**
No.

**Somatic**
No.

**Implicated in**

**Various tumors**

**Disease**
There have been few reports of overexpression of CDC20 in various tumors for eg, greater than 3% of Cdc20 expression was found in bladder cancer, breast cancer, cervical cancer, cholangiocellular carcinoma, AML, CML, colon and rectum carcinoma, esophageal cancer, gastric cancer, gastric cancer (diffuse type), liver cancer, lung cancer (NSCLC), lung cancer (SCLC), osteo-sarcoma, pancreatic cancer, prostate cancer, renal carcinoma, soft tissue tumor, testicular tumor (Kidoko T, et al., 2007), head and neck cancer (Mondal G, et al., 2007).

**Prognosis**
No.

**Cytogenetics**
No.

**Hybrid/Mutated gene**
No.

**Abnormal protein**
No.

**Oncogenesis**
Overexpression of CDC20 has been observed in several tumor tissues.

**References**


Kallio M, Weinstein J, Daum JR, Burke DJ, Gorbsky GJ. Mammalian p55CDC mediates association of the spindle checkpoint protein Mad2 with the cyclosome/anaphase-promoting complex, and is involved in regulating anaphase onset and late mitotic events. J Cell Biol. 1998 Jun 15;141(6):1393-406


Fraschini R, Beretta A, Sironi L, Musacchio A, Lucchini G, Platti S, Bub3 interaction with Mad2, Mad3 and Cdc20 is mediated by WD40 repeats and does not require intact kinetochores. EMBO J. 2001 Dec 3;20(23):6648-59


Tang Z, Shu H, Oncel D, Chen S, Yu H. Phosphorylation of Cdc20 by Bub1 provides a catalytic mechanism for APC/C inhibition by the spindle checkpoint. Mol Cell. 2004 Nov 5;16(3):387-97


This article should be referenced as such: