BBI Solutions

CA15-3

Abbreviations	CA15-3, MUC 1
Accession Number	P15941
Source	Human carcinoma cell line
Applications	Control Manufacture, Life Science, Clinical Chemistry, Biosensors, ELISA Assay, Lateral Flow

Protein Structure and Function

Encoded by the MUC1 gene, MUC-1 is a mucin glycoprotein based on core peptide domain of 20 amino acid (PGSTAPPAHGVTSAPDTRPA) tandem repeats which form the polypeptide structure.[1] Also known by the name polymorphic epithelial mucin the protein is excreted as a coating that forms a physical barrier, that protects epithelial cells from stress-induced damage.

The CA15-3 antigen was originally defined by reactivity of MUC-1 with two monoclonal antibodies DF3 and 115D8, identifying the protein as a potential marker to detect breast cancer. Recent work has shown that the glycosylation varies depending on the site of expression in different organs. However, this does not seem to be related to its function. Studies on the adhesion of MUC-1 have indicated that it has a role in cell to cell and cell-extracellular matrix interaction. MUC-1 is a transmembrane protein with a short intracellular and a giant extracellular domain. The extracellular part of the protein consists of amino acid repeats of 20 to 125 dependent on the genetic polymorphism. These repeats act as a scaffold for the glycosylation of serine and threonine by N-Acetyl galactoside (Gal NAc). MUC1 is also an important component of the mucosal barrier that is upregulated in response to infection with pathogenic bacteria.

Tissue Occurrence & Abundance

CA15-3 (MUC-1) is expressed by most simple epithelial cells, and its expression is upregulated in the breast during pregnancy and lactation. It is secreted via the endoplasmic reticulum (ER) and Golgi apparatus by a signal peptide independent mechanism. MUC 1 expression is confined to the apical side of glandular epithelial cells, whereas in cancer expression it can be detected over the whole cell membrane. There is no recognised standard for MUC-1. Units for CA15-3 are expressed as arbitrary units that can be linked back to the original work, defining the antigen using the monoclonal antibodies. There have been recent publications that indicate a new international standard to more clearly define the measured values. This would be helpful in harmonising the results for CA15-3 immunoassays.[2]

Function in Disease

CA15-3 measurement is not recommended for early disease diagnosis due to the non-specific expression of the protein. The main application for measurement of CA15-3 has been shown to monitor disease progression for patients with breast cancer to detect distant tumour metastasis.[3] Serial testing can assist in early detection of disease recurrence in previously treated stage II and III breast cancer patients. CA15-3 has also been demonstrated to have utility for monitoring response to therapy in metastatic breast cancer patients.

Structure

Molecular weight	122,102 Da (Theoretical peptide molecular weight without glycosylation)
Amino acids	1255
Polymorphism	16 identified isoforms
Disulphide bonds	May contain numerous disulfide bridges
Glycosylation	Highly glycosylated (N- and O-linked carbohydrates and sialic acid). O-glycosylated to a varying degree on serine and threonine residues within each tandem repeat, ranging from mono- to penta-glycosylation
Phosphorylation	Phosphorylated on tyrosines and serine residues in the C-terminal

References

1. Gendler S.J. and Spicer A.P. (1995) Epithelial Mucin Genes Ann. Rev. Physiol. 57, 607-634
2. Sturgeon C, (2016) Standardization of tumor markers – priorities identified through external quality assessment. Scand. J. Clin. Lab. Invest. 76, S245, S94–S99
3. Duffy M.J. (1999) CA15-3 and related Mucins as circulating markers in breast cancer. Ann. Clin. Biochem. 36, 579–586

BBI Solutions

CA15-3

WHY CHOOSE BBI'S CA15-3 ANTIGENS?

+ Our production facilities allow us to offer consistent and reproducible **large batch sizes** up to thousands of Ku
+ With a network of global labs and hospitals, we can access many **diverse testing platforms**, providing you with the exact analysis results you need
+ With over 25 years' experience sourcing human biologicals and a stable cell line you can be confident in a **secure European supply chain**
+ We can provide the **complete package** with CA15-3 antibodies and patient samples too, speak to us about a package deal
+ **Very low cross reactivity** with closely-related molecules
+ We can **adapt dispensations and testing methodologies** to meet your needs

Grade & Concentration	Low cross reactivity grade, >10Ku/ml	
Stability & Formulation	Supplied liquid frozen – Store at below -15°C	
Assay recovery and contamination profile specification	CA125 concentration by Roche Modular	< 10% of CA15-3
	CA19-9 concentration by Roche Modular	< 10% of CA15-3
	CA72-4 concentration by Roche Modular	< 10% of CA15-3
	CYFRA 21 concentration by Roche Modular	<10% of CA15-3 based on 1U = 1ng
	CEA concentration by Roche Modular	<10% of CA15-3 based on 1U = 1ng
Dispensations	P301-4 - 10Ku, 100Ku, 1000Ku	

Ordering Details

USE THE FOLLOWING CODES WHEN ORDERING

Product	Code	Description
CA15-3	P301-4	Supplied liquid frozen in PBSA Buffer, assayed by Roche Modular | sourced from human carcinoma cell line

Related Products

CA125	P251-4	Low cross reactivity high concentration. Formulated at >250Ku/ml.
CA15-3 mAb	BM236-K2F4	WB | ELISA – Capture paired with BM236-K6A5 as detection
CA15-3 mAb	BM236-V2G9	WB | ELISA – Capture mAb paired with BM236-K6A5 as detection mAb
CA15-3 mAb	BM236-K6A5	WB | ELISA – Detection paired with BM236-K2F4 / BM236-V2G9 as capture
CA15-3 serum Patient Samples	SG362-2	Serum samples from patients with a raised level of the cancer marker CA15-3.

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