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BREAST CANCER RESEARCH FOCUS

Introduction

Background

Breast cancer is the leading malignant disease in Western women and worldwide the most common cause of death in women. It is not the primary breast tumour, but the metastases that are responsible for the high incidences of death. Even if mammography and surgical removal followed by cytotoxic chemotherapy have helped to contain the mortality incidences during the last years,[1,2] the incidences of patients with breast cancer is increasing.

Challenge

Breast cancer is a very heterogenic disease; several epigenetic and genetic factors are involved in the progression of breast cancer, hindering the validation of precise biomarkers. Also, the origin of breast cancer metastasis is diverse and complicates the validation of risk factors and the tailoring of a clinical treatment.[3]

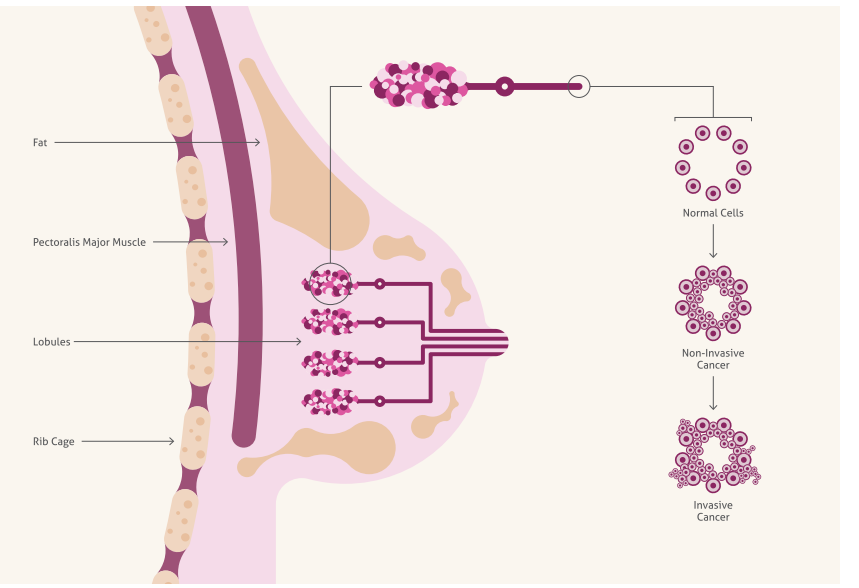
Strategy

Understanding the metastatic processes going on during the development of breast cancer will help to improve clinical treatments of the disease. In metastasis, a rare sub-cell-population of the primary tumour showing distinct genetic characteristics, start to metastasize.[4]

Current Research Direction

Researchers focus on new prognostic markers that characterize high-risk patients likely to develop metastases. Microarray gene-expression profiling is a widely used tool for the validation of new prognostic markers. Still, its use shows limitation and needs improvement, but it does appear to be the most promising tool these days.

Breast Anatomy And Breast Cancer Types

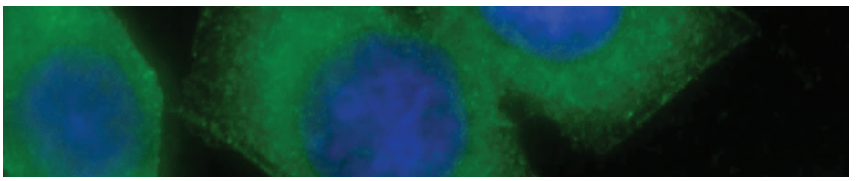


Making Connections:
Breast cancer-associated stroma and palladin

Stroma, the connective and supportive framework of cells that underly the tissues and organs of the body, can have a protective function against cancer – delaying or preventing tumor formation. However, it is becoming increasingly recognized that in cases of invasive carcinoma, stromal changes can create a permissive and supportive environment for tumor growth. In more advanced stages of cancer stroma can even stimulate invasion and metastases, which inevitably results in poor prognosis. Therefore, it is becoming increasingly important for oncology researchers to consider the role of tumor-associated stroma in tumor growth, progression and migration.

Previously, PALLD – encoding the cytoskeletal protein palladin – has been shown to contribute to the invasive motility of human breast cancer cell.[5] A similar study also found that breast cancer cell migration can be regulated by palladin directly.[6] Furthermore, this work reported that the aberrant behavior of wild-type palladin in breast cancer cell migration is linked to the deregulation of the PI3-kinase (PI3K) pathway; this is specifically through enhanced phosphorylation of the palladin protein by Akt2 (PKBß). This interplay between faulty PI3K signaling and wild-type palladin emphasizes the idea that PALLD does not have to fall foul of mutations itself to play a role in malignancy – it can be seemingly normal.

Recently, upregulation of the PALLD gene in stromal cancer-associated fibroblasts (CAFs) has been shown to promote the invasiveness of adjacent tumor cells.[7] Whilst this work was carried out in a pancreatic cancer model, the question of whether PALLD plays a similar role, facilitating pathological interactions between breast cancer cells and their associated fibroblasts, is intriguing.



Immunofluorescence staining of HeLa cells with PALLD (10853-1-AP) at a dilution of 1:50; goat anti-rabbit IgG (H+L) Alexa Fluor 488 conj.

Palladin-related Antibodies

Antibody Name	Catalog Number	Type	Applications
PALLD	36 10853-1-AP	Rabbit Poly	ELISA, FC, IF, IHC, IP, WB
PALLD	16179-1-AP	Rabbit Poly	ELISA, IP, WB

00 This number shows the amount of times our antibody has been cited in a publication.

Product Focus:
Matrix Metalloproteinase Antibodies

The study of matrix metalloproteinases (MMPs) is highly relevant to cancer research, particularly in the area of metastasis. MMPs are differentially expressed in breast cancer and their expressions are often associated with a poor prognosis for patient. Secreted into the extracellular matrix (ECM), these zinc-dependent endopeptidases are capable of degrading many kinds of ECM protein and facilitating invasion and migration. Conversely, they can also inhibit metastasis in certain scenarios. Proteintech has a collection of antibodies recognizing MMP proteins. We have presented a selection of these antibodies below:

MMP-1
Catalog number: 10371-2-AP
Type: Rabbit Polyclonal
Applications: ELISA, FC, IF, IHC, IP, WB
Publications: 9

MP-1 is a collagenase that breaks down the interstitial collagens types I, II and III. MMP-1, expressed by prostate cancer cells, has also been shown to cleave the 3 chain of laminin 5 (Ln-5).[8] Cleavage of Ln-5 is a known contributing factor towards metastasis.[9]

MMP-2
Catalog number: 10373-2-AP
Type: Rabbit Polyclonal
Applications: ELISA, IHC, IP, WB
Publications: 37

This enzyme is a gelatinase ad collagenase IV; it plays a role in regulation of vascularization and the inflammatory response. Our anti-MMP-2 antibody last appeared in a 2011 paper[10] describing the effects of stable knockdown of Aurora kinase A on MMP-2, as well as proliferation, migration, chromosomal instability, and expression of focal adhesion kinase.

MMP-3

Catalog number: 17873-1-AP
Type: Rabbit Polyclonal
Applications: ELISA, IF, IHC, WB
Publications: 14

MMP-3, also known as Stromelysin-1, degrades many types of ECM protein including: collagens types II-IV, IX and X, proteoglycans, laminin, elastin and fibronectin. MMP-3 is known to activate several other MMPs such as MMP-1, MMP-7 and MMP-9. All the above make it a crucial factor in connective tissue remodeling. Our MMP-3 antibody is validated for Western blot (WB), immunohistochemistry (IHC), ELISA, and immunofluorescence stainings.

MMP-7

Catalog number: 10374-2-AP
Type: Rabbit Polyclonal
Applications: Dot Blotting, ELISA, IHC, WB
Publications: 11

MMP-7 is also known as matrilysin and it differs from other MMP proteins as it lacks the conserved C-terminal protein domain of the family. The enzyme can degrade proteoglycans, fibronectin, elastin and casein. Proteintech's MMP-7 antibody has appeared in several publications so far, one publication outlines a study looking at clinical outcome markers of human hepatocellular carcinoma (HCC) produced by tumor stroma.[11] The study found that MMP-7 was among those prognostic markers that were reliably indicative of HCC recurrence.

MMP-9

Catalog number: 10375-2-AP
Type: Rabbit Polyclonal
Applications: Dot Blotting, ELISA, IF, IHC, IP, WB
Publications: 42

MMP-9, like MMP-2, belongs in the category of gelatinase MMPs and also degrades type IV and V collagens. It is probably one of the most studied in metastasis, which may be due to its integral role in angiogenesis.[12] Proteintech's MMP9 antibody has featured, for instance, in a publication describing a case of pulmonary capillary hemangiomatosis (PCH)[13] – a rare disorder of alveolar capillary proliferation. The authors found that PCH lesions contained significant numbers of macrophages expressing MMP-9.

Related Antibodies

Antibody Name	Catalog Number	Type	Applications
ACTA2/SMA (34)	14395-1-AP	Rabbit Poly	ELISA, FC, IF, IHC, IP, WB
COL1A2 (17)	14695-1-AP	Rabbit Poly	ELISA, IF, IHC, WB
CXCL7 (PPBP)	13313-1-AP	Rabbit Poly	ELISA, IHC, WB
CXCL8 (2)	17038-1-AP	Rabbit Poly	ELISA, IHC, WB
CXCL8 (2)	60141-2-IG	Mouse Mono	ELISA, IHC, WB
IGF1A (5)	20214-1-AP	Rabbit Poly	ELISA, IF, IHC, IP
IGF1B	20215-1-AP	Rabbit Poly	ELISA, IHC, WB
IL1A	16765-1-AP	Rabbit Poly	ELISA, WB
IL1B (12)	16806-1-AP	Rabbit Poly	ELISA, IF, IHC, WB
IL1F7	11863-1-AP	Rabbit Poly	ELISA, WB
MMP-1 (9)	10371-2-AP	Rabbit Poly	ELISA, FC, IF, IHC, IP, WB
MMP-13 (13)	18165-1-AP	Rabbit Poly	ELISA, IF, IHC, WB
MMP-14	14552-1-AP	Rabbit Poly	ELISA, IF, WB
MMP-19	14244-1-AP	Rabbit Poly	ELISA, IF, IHC, IP, WB
MMP-2 (37)	10373-2-AP	Rabbit Poly	ELISA, IF, IHC, IP, WB
MMP-23A/B	13020-1-AP	Rabbit Poly	ELISA, IHC, WB
MMP-28 (1)	18237-1-AP	Rabbit Poly	ELISA, IF, IHC, WB
MMP-3 (14)	17873-1-AP	Rabbit Poly	ELISA, IF, IHC, WB
MMP-7 (11)	10374-2-AP	Rabbit Poly	ELISA, IHC, WB
MMP-8 (2)	17874-1-AP	Rabbit Poly	ELISA, IHC, IP, WB
MMP-9 (41)	10375-2-AP	Rabbit Poly	ELISA, IF, IHC, IP, WB
PALLD (35)	10853-1-AP	Rabbit Poly	ELISA, FC, IF, IHC, IP, WB
SPARC (7)	15274-1-AP	Rabbit Poly	ELISA, IF, IHC, WB
VEGFA (31)	19003-1-AP	Rabbit Poly	ELISA, IF, IHC, IP, WB

00 This number shows the amount of times our antibody has been cited in a publication.

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