# OVARIAN CANCER RESEARCH FOCUS

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Introduction

Epithelial ovarian cancer (EOC) is the most aggressive form of the gynecological cancer types and is the fourth most common cause of female cancer death in developed countries.[1] The ovary is a complex tissue, and although ovarian cancers can originate from germ cells or granulosa-theca cells, most ovarian cancers have an epithelial histology.

EOC can be found in women at any age. However, it is most common in women over the age of 50. Unfortunately, the disease is mainly diagnosed at an advanced stage due to a lack of early biomarkers and confusing clinical pathology. Treatment of EOC is mainly based on a combination of surgery with chemotherapy. The survival rate, however, is poor, at <5 years.[2] Early diagnosis is therefore fundamental to achieving a higher cure rate.

In this mini-catalog, Proteintech will focus on ovarian cancer-related targets in order to support researchers in their work on understanding ovarian cancer biology, identification of new markers, and the molecular characteristics of ovarian cancer.

Histopathological Types

Schema of the ovary showing the histopathological types of ovarian cancer. Epithelial ovarian cancer is the most common cause.
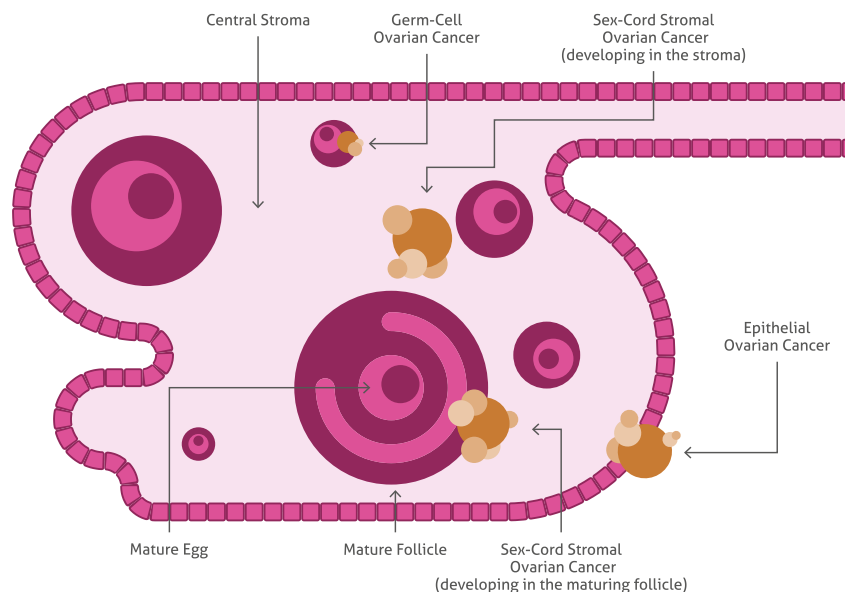
Symptoms Of Ovarian Cancer

SIgns/symptoms related to ovarian cancer
Weight loss
Discomfort in the pelvic area
Abdominal swelling/bloating
Frequent need to urinate
Quickly feeling full when eating
Constipation
Constant tiredness

Tumor Suppressor Genes and Oncogenes

Several putative tumor suppressor genes and well-established oncogenes have been identified in the development of ovarian cancer.

Broadly, all EOC patients have mutations in the p53 (10442-1-AP) gene [3, 4] and loss of functional p53 protein is crucial for a cell. The TP53 (21891-1-AP) gene encodes a transcription factor that plays a critical role in regulating cell cycle progression, DNA repair, or cell death.[5, 6]

Besides the large number of already known potential targets in ovarian cancer, the identification of new targets is essential for understanding EOC mechanisms and identifying the disease at an early stage. Recent data demonstrate, for instance, that WT1 (12609-1-AP) is expressed at a high frequency in patients with EOC.[7]

WT1 is normally required for formation of the genitourinary system and mesothelial tissues. Recently, it was also demonstrated that the well-known heat-shock protein 90 (Hsp90) is a novel target protein in ovarian cancer. Hsp90 (13171-1-AP) provides chaperoning activity for different proteins; many of these are members of oncogenic pathways. In ovarian cancer, inhibition of Hsp90 has been shown to have anti-proliferative effects [8,9,10]; however, the exact molecular mechanism remains unclear.

Due to the heterogeneity of ovarian cancer, it is of high importance to characterize and identify the different abnormalities present in ovarian cancer. Proteintech offers a wide range of antibodies for the study of ovarian cancer.

Related Products

Antibody Name		Catalog Number	Applications
HSP90	14	13171-1-AP	ELISA, FC, IF, IHC, IP, WB
K-Ras	22	12063-1-AP	ELISA, FC, IF, IHC, IP, WB
p53	73	10442-1-AP	ELISA, IF, IHC, IP, WB
p53	1	21891-1-AP	ELISA, IF, IHC, IP, WB
WT1	1	12609-1-AP	ELISA, IP, WB

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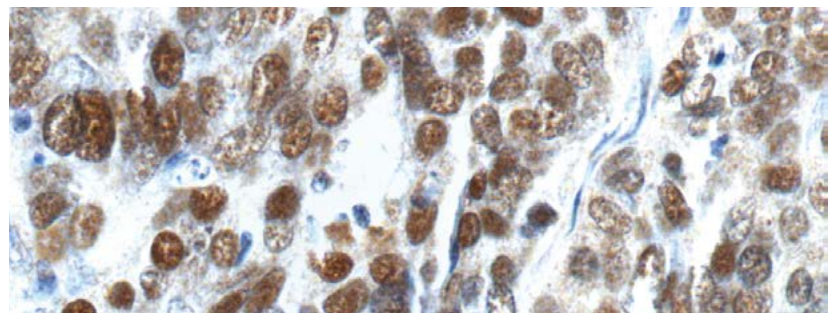
Immunohistochemistry of paraffin-embedded human ovary tumor tissue slide using 21891-1-AP (p53 Antibody) at dilution of 1:200 (40x lens).

PRODUCT FOCUS

HER2/ErbB2 Antibody

Catalog Number
60311-1-Ig

Type
Mouse Monoclonal

Applications
ELISA, FC, IHC

HER2, also known as ErbB2 and Neu, is a 185-kDa transmembrane glycoprotein that is a member of the epidermal growth factor (EGF) receptor family of receptor tyrosine kinases. It has no ligand-binding domain of its own and therefore cannot bind growth factors. Amplification and/or overexpression of HER2 has been reported in numerous cancers, including breast and ovarian tumors.

Biomarkers

Despite the intensive use of conventional methods to detect ovarian cancer progression, ovarian cancer remains a commonly fatal gynecological disease. The current challenge is to detect ovarian cancer at an early stage. Effective screening methods have so far failed due to a lack of specificity and sensitivity. Biomarkers for precise detection of ovarian cancer are greatly needed to monitor and understand details of ovarian cancer tumorigenesis.

The latest studies report that HE4 (14406-1-AP) can be referred as a biomarker for ovarian carcinoma.[11] HE4 is expressed in a number of normal tissues, and it is also highly expressed in a number of tumor cell lines.

Metastasis to the peritoneal surface requires the adhesion of ovarian cancer cells to the mesothelial cells. Epithelial cell-adhesion molecule (EpCAM, CD326, 21050-1-AP) functions as an epithelial-specific intercellular cell-adhesion molecule.[12, 13] It is of special interest as a potential diagnostic and prognostic marker for ovarian cancer.

Osteopontin has been shown in multiple studies, including, among others, a microarray analysis of ovarian cancer cell lines and healthy human ovarian surface epithelial cell cultures, to be a potential biomarker.[14] However, to date, the functional mechanisms of osteopotin in ovarian cancer remain poorly understood.[15]

Proteintech always reviews recent research on novel biomarkers for the detection of ovarian cancer. For more details go to www.ptglab.com.

Related Products

Antibody Name		Catalog Number	Applications
CD138/Syndecan-1	4	10593-1-AP	CoIP, Dot Blotting, ELISA, IF, IHC, WB
CD146/MCAM	3	17564-1-AP	ELISA, FC, IF, IHC, IP, WB
CD147	7	11989-1-AP	ELISA, IF, IHC, IP, WB
CD34	4	14486-1-AP	ELISA, IF, IHC, WB
CX3CR1	1	13885-1-AP	ELISA, FC, IHC, IP, WB
EPCAM, CD326	8	21050-1-AP	ELISA, FC, IF, IHC, WB
HE4		14406-1-AP	ELISA, IHC, WB
HNF1B	7	12533-1-AP	ELISA, IF, IHC, WB
HOXA7, NCOA6		25241-1-AP	ELISA, IP
MUC1/CA15-3	1	19976-1-AP	ELISA, FC, IHC, IP, WB
Osteopontin	6	22952-1-AP	ELISA, IF, IHC, WB
PD-1	1	18106-1-AP	ELISA, FC, IF, IHC, WB
PR		66300-1-Ig	ELISA, IHC
SALL4	3	24500-1-AP	ELISA, IF, IHC, IP, WB

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PRODUCT FOCUS

MUC16/CA125 Antibody

Catalog Number
60261-1-Ig

Type
Mouse Monoclonal

Applications
ELISA, IHC

MUC16/CA125 is a glycosylated transmembrane mucin that is overexpressed in the majority of ovarian cancers. It is an important factor involved in cell adhesion, motility, and invasion of ovarian cancer. On the reverse side, knockdown experiments of CA125 showed a decrease in invasion of OC.
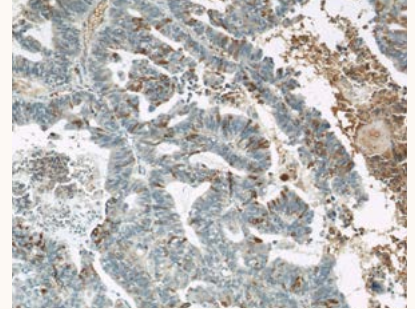
Immunohistochemical of paraffin-embedded human ovary tumor using 60261-1-Ig (MUC16,CA125 antibody) at dilution of 1:50 (10x objective).

PAX8 Antibody

Catalog Number
10336-1-AP

Type
Rabbit Polyclonal

Applications
**ELISA, FC, IF, IHC, IP, WB**

185 Publications

si **Tested with siRNA**

The paired box 8 (PAX) gene is a transcription factor expressed during organogenesis of the thyroid gland, kidney, and Müllerian ducts. PAX8 belongs to a family of 9 proteins (PAX1-PAX9) where each member is directly implicated in the transcription of various genes, PAX members typically containing a paired box domain and a paired-type homeodomain. PAX8 is expressed in a high percentage of ovarian serous, endometrioid, and clear-cell carcinomas, but only rarely in primary ovarian mucinous adenocarcinomas. In this setting, PAX8 is also a useful marker for distinguishing ovarian carcinomas from those of mammary origin, and is shown to be significant in many more forms of cancer.

It is thought to regulate the expression of Wilms tumour suppressor (WT1) gene and mutations in PAX8 have been associated with Wilms tumour cells, thyroid and ovarian carcinomas. Research continues to shed light on its diagnostic value. Differentiating metastatic female genital tract tumours from primary ovarian tumours is one of the most important issues in this field. Recent evidence supports the utility of PAX8 factor, especially in determining Müllerian tumours. Differentiation of ovarian metastatic tumours (especially with breast origin) from primary ovarian tumours can also be performed based on this IHC staining. The molecular mechanism of PAX8 in the carcinogenesis up to now remains unclear and requires further studies.
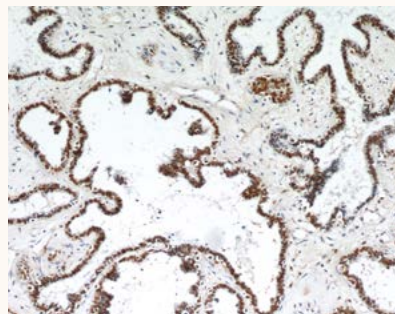
Immunohistochemical of paraffin-embedded human ovary tumor using 10336-1-AP (PAX8 antibody) at dilution of 1:50 (10x lens).
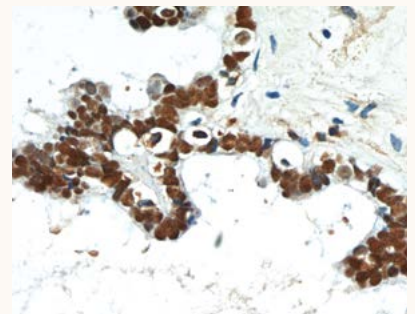
Immunohistochemical of paraffin-embedded human ovary tumor using 10336-1-AP (PAX8 antibody) at dilution of 1:50 (40x lens).

Signaling

Many different signaling pathways are activated in ovarian cancer and current studies focus on the exact mechanism and molecules involved in signaling pathways that are frequently activated in ovarian cancer.

The PI3K (20584-1-AP) pathway has been shown to play a significant role in the majority of ovarian cancer cases. The activation can occur either by autocrine/paracrine signaling or by different targets like PTEN (22034-1-AP) or Akt (10176-2-AP). The inhibition of PI3K has been shown to prevent ovarian cancer growth in xenografts models, for instance.[16, 17]

Another important player is IL-6 (21865-1-AP). Once the IL-6 receptor is activated, activation of the JAK-STAT cascade follows (17670-1-AP, 10253-2-AP). STAT has been reported to be crucial for the regulation of different biological functions like proliferation or apoptosis.[18]

The number of cytokines involved in ovarian cancer is numerous, as shown by the activation of NF-κB. NF-κB shows activation in the majority of EOC cases [19, 20] and it is well known that multiple cytokines or growth factors can lead to NF-κB activation.

Following the activation of signaling pathways, many different downstream mechanisms get switched on. Ovarian cancer cells show increased resistance to apoptosis and, at a more advanced stage, cancer cells metastasize. For instance, matrix metalloproteinases (MMP2, 10373-2-AP; MMP7, 10374-2-AP) have been found in EOC, thereby increasing invasion.[21] More effector proteinases, such as Kallikreins (Kallikrein 8, 14232-1-AP), have been found in EOC.[22]

Many more ovarian cancer-related targets can be found on www.ptglab.com.

Related Products

Antibody Name		Catalog Number	Applications
Akt	56	10176-2-AP	ELISA, FC, IF, IHC, IP, WB
Cathepsin B	3	12216-1-AP	ELISA, FC, IF, IHC, WB
IGFBP2	1	11065-3-AP	ELISA, IHC, IP, WB
IL-6	24	21865-1-AP	ELISA, IHC, WB
Jak2	1	17670-1-AP	ELISA, IP, WB
Kallikrein 8		14232-1-AP	ELISA, IHC, WB
MMP2	56	10373-2-AP	ELISA, IF, IHC, IP, WB
MMP7	14	10374-2-AP	Dot Blotting, ELISA, IHC, WB
NF-κB	16	14220-1-AP	ELISA, IF, IP, WB
PI3K	5	20584-1-AP	ELISA, IF, IHC, WB
Src	9	11097-1-AP	ELISA, FC, IF, IHC, IP, WB
Stat3	13	10253-2-AP	ChIP, ELISA, FC, IF, IHC, IP, WB

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Progression Of Ovarian Cancer

Healthy Ovary   Localised Ovarian Cancer   Metastatic Ovarian Cancer
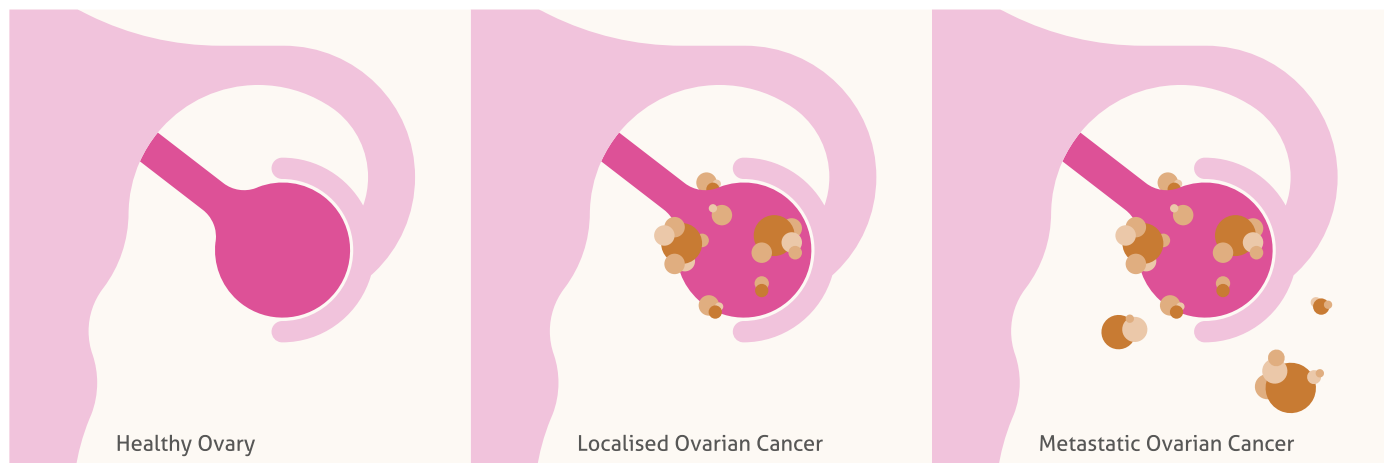
PRODUCT FOCUS

PTEN Antibody

Catalog Number
22034-1-AP

Type
Rabbit Polyclonal

Applications
ELISA, IF, IHC, WB

9 Publications

PTEN (Phosphatase and tensin homolog), also known as MMAC1 and TEP1, modulates cell cycle progression and cell survival (blockage) through down-regulating the positive cell cycle regulator (Cyclin D1) by its phosphatase activity and up-regulating the negative cell cycle regulator p21 (by its lipid phosphatase activity).
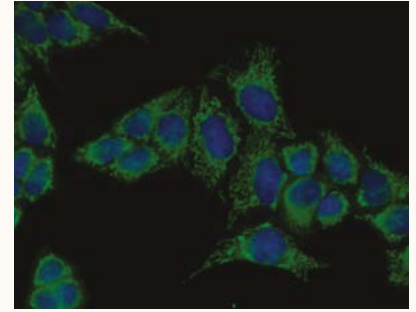
Immunofluorescent analysis of (10% Formaldehyde) fixed HeLa cells using 22034-1-AP(PTEN Antibody) at dilution of 1:50 and Alexa Fluor 488-congugated AffiniPure Goat Anti-Rabbit IgG(H+L).

More Ovarian Cancer-Related Products

Antibody Name		Catalog Number	Applications
Annexin I	3	21990-1-AP	ELISA, IF, IHC, IP, WB
Annexin II	15	11256-1-AP	ELISA, IF, IHC, IP, WB
Annexin V	2	11060-1-AP	ELISA, FC, IF, IHC, IP, WB
Claudin 3		16456-1-AP	ELISA, IHC, IP, WB
Claudin 4	1	16195-1-AP	ELISA, IHC, IP, WB
Creatine kinase B		19713-1-AP	ELISA, IF, IHC, WB
MMP2	56	10373-2-AP	ELISA, IF, IHC, IP, WB
MMP7	14	10374-2-AP	Dot Blotting, ELISA, IHC, WB
NME1		11086-2-AP	ELISA, IF, IHC, IP, WB
PRSS8	4	15527-1-AP	ELISA, IHC, WB
SPIN1	2	12105-1-AP	ELISA, IF, IHC, IP, WB
tPA	3	10147-1-AP	ELISA, IHC, IP, WB

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