ANGIOGENIN: A NEW VASCULARIZATION MARKER IN COLORECTAL CARCINOMA

Essay

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Presented By

Magy Samir Maiz Girgis
M.B.B. Ch.

Under the Supervision of

Professor Sawsan Said Hafez
Professor of Clinical and Chemical Pathology
Faculty of Medicine, Ain Shams University

Doctor Manal Mohamed Abd Al-Aziz
Assistant Professor of Clinical and Chemical Pathology
Faculty of Medicine, Ain Shams University

Doctor Eman Saleh El-Hadidi
Lecturer of Clinical and Chemical Pathology
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
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List of Abbreviations

AAPC	: Attenuated form of adenomatous polyposis coli.
aFGF	: acidic fibroblast growth factor.
Ang	: Angiopoietin
APC	: Adenomatous polyposis coli
Asn	: Asparagine
b-FGF	: basic fibroblast growth factor.
CA19.9	: Carbohydrate antigen 19.9
cDNA	: Complementary deoxyribonucleic acid
CEA	: Carcinoembryonic antigen.
CT	: Computerized tomography
DCBE	: Double contrast barium enema.
DCC	: Deleted in colorectal cancer
DNA	: Deoxyribonucleic acid
ELISA	: Enzyme linked immunosorbent assay
FAP	: Familial adenomatous polyposis
FGF	: Fibroblast growth factor.
FGF-BP	: Fibroblast growth factor binding protein
FGFR	: Fibroblast growth factor receptor.
FOBT	: Fecal occult blood test
Gly	: Glycine
HCC	: Hepatocellular carcinoma
HGF	: Hepatocyte growth factor.
HIF-1	: Hypoxia-inducible factor-1
His	: Histidine
HNPCC	: Hereditary non polyposis colotectal cancer.
KDa	: Kilo Dalton.
LOH	: Loss of heterozygosity
Lys	: Lysine
MIN	: Microsatellite instability
MMP	: Matrix metalloproteinase

MMR	: Mismatch repair
mRNA	: Messenger ribonucleic acid
NLS	: Nuclear localization sequence
NSAIDs	: Non steroidal antiinflammatory drugs
NSCLC	: Non-small cell lung cancer
PAI-1	: Plasminogen activator inhibitor type-1
PCR	: Polymerase chain reaction
PD-ECGF	: Platelet derived endothelial cell growth factor.
PDGF	: Platelet derived growth factor.
PDGF-R	: Platelet derived growth factor receptor.
PDGF-RB	: Platelet derived growth factor receptor beta
PDR	: Proliferative diabetic retinopathy
PLC	: Phospholipase C
PMHR	: Postmolar gestational trophoblastic tumor
PMN	: Polymorph nuclear
Rb	: Retinoblastoma
RER+ve	: Replication error positive.
RNase	: Ribonuclease
r-RNA	: Ribosomal ribonucleic acid
RRRGL	: R: Argenine G: Glycine
SCLC	: Small cell lung cancer
TGF	: Transforming growth factor
Th	: T helper
TNF	: Tumor necrosis Factor
TNM	: Tumor Node Metastasis
t-RNA	: Transfer ribonucleic acid
TSP	: Thrombospondin
VEGF	: Vascular endothelial growth factor
VEGF-R	: Vascular endothelial growth factor receptor.

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INTRODUCTION

Angiogenesis refers to the development of new blood vessels from preexisting vasulature. The angiogenesis process is fundamental to tumor growth. It is implicated in the initial progression from a premalignant tumor to a cancer, invasion of cancer cells into the circulation and growth of micrometastasis into frank metastatic lesions *(Hanahan and Folkman, 1996).*

The process of angiogenesis is triggered by angiogenic factors derived from tumor cells and infiltrative cells such as; macrophage and fibroblasts. The best-characterized angiogenesis factors include angiogenin, vascular endothelial growth factor, interleukin-8, fibroblast growth factor and others. Their action is antagonized by many antiangiogenic factors, such as angiostatin, endostatin, thrombospondin-1 and -2 and others *(Takahashi et al., 1996).*

Angiogenin is a potent blood vessel inducing protein that was originally purified from the human colon carcinoma cell line. It was later found in normal human serum, and its mRNA was found to be expressed in human tumor cells, as well as non malignant cells such as peripheral blood cells, vascular endothelial cells and fibroblasts. Increased angiogenin expression in tumor tissue, and its serum

concentration was observed in patients with various tumors such as; pancreatic carcinoma, urothelial carcinoma, colorectal carcinoma and others *(Dosquet et al., 1997 and Miyake et al., 1999)*.

Concerning colorectal carcinoma, serum angiogenin concentration is found to be higher than that in nonneoplastic diseases. The mean serum angiogenin concentration is positively correlated with the tumor progression and cancer stage, whereas, after cancer resection it decreases to nearly normal level. Accordingly, serum angiogenin could be useful as a diagnostic marker for stage grouping and Dukes classification as a result of cancer cell invasion. Moreover, its assay could be potentially useful for long time follow-up of patients as an early marker of recurrence *(Shimoyoma et al., 1999 and Shimoyoma et al., 2002)*.

Aim of the study

To study the role of angiogenic factors specially angiogenin as a diagnostic and prognostic marker in colorectal carcinoma mainly and in other carcinomas.

I. COLORECTAL CANCER

A. Epidemiology and Risk Factors of Colorectal Cancer:

1. Incidence

Colorectal cancer is a common and lethal disease. The number of patients with colorectal cancer has been increased in the last years *(Cole, 1999)*. It is the fourth commonest form of cancer occurring world wide, with an estimated 9% of all cancers in men and 10.1% in women. In western countries it represents 12.6% of all cancers in men and 14.1% in women *(Cole, 1999 and Peter et al., 2000)*.

Colorectal cancer is frequent in the population of equatorial Africa and Southeast of Asia. It has been noted frequently that migrants from low risk areas to higher risk areas tend overtime to acquire similar incidence of large bowel malignancy like that of the native population, which led some epidemiologists to postulate that the cause of this cancer is not racial or genetic but environmental *(Cole, 1999)*.

Soliman and his colleages (1999) found that in Egypt, colorectal cancer represents 12% for male and 11.5% for female cancers respectively. An individual with no specific risk factors has a lifetime chance of developing colorectal cancer approaching 6%.