
Clinical Significance of Angiopoietins in Different Pathological Conditions

Essay

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
{قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْحَكِيمُ}
صدق الله العظيم

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LIST of ABBREVIATIONS

aFGF	: Acidic fibroblast growth factor
Angs	: Angiopoietins
AM	: Adrenomedullin
bFGF	: Basic fibroblast growth factor
DNA	: Deoxy ribonucleic acid
E8.5	: Embryonic day 8.5
ECM	: Extra-cellular matrix
EDTA	: Ethylene Diamine tetra acetic acid
EGF	: Epidermal growth factor
ELISA	: Enzyme linked immunosorbent assay
eNOS	: Endothelial nitric oxide synthase
Eph	: Ephrin
FGF	: Fibroblast growth factor
Flk-1	: Fetal liver kinase
Flt-1	: Fms-like tyrosine kinase 1
HGF	: Hepatocyte growth factor
HSPG	: Heparan sulfate proteoglycans
IHC	: Immunohistochemistry
Ig	: Immunoglobulin
IL	: Interleukin
ILMA	: Immunoluminometric assay

LIST of ABBREVIATIONS (Cont.)

ISH	: In situ hybridization
IRMA	: Immunoradiometric assay
KDR	: Kinase domain region
mAbs	: Monoclonal antibodies
MMPs	: Matrix metallo-proteinases
mRNA	: Messenger ribonucleic acid
ND	: Not determined
NGF	: Nerve growth factor
NPY	: Neuropeptide Y
PAMP	: Proadrenomedullin N-terminal 20 peptide
PDGF	: Platelet derived growth factor
PI3-K	: Phosphatidylinositol 3' kinase
PIGF	: Placental growth factor
RA	: Rheumatoid arthritis
RGD	: Arginine glycine aspartic acid
RTK	: Receptor tyrosine kinase
RT-PCR	: Reverse transcriptase polymerase chain reaction
SMC	: Smooth muscle cells
Tek	: Tunica endothelial kinase
TF	: Tissue factor

LIST of ABBREVIATIONS (Cont.)

Tie	: Tyrosine kinase with immunoglobulin and epidermal growth factor homology domain
TP	: Thymidine phosphorylase
tPA	: Tissue type plasminogen activator
uPA	: Urokinase type plasminogen activator
VEGF	: Vascular endothelial growth factor

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INTRODUCTION and AIM of THE ESSAY

INTRODUCTION

The formation of functional vasculature is a complex process requiring spatial and temporal coordination of multiple, receptors, intracellular signaling pathways, regulatory factors and angiogenic factors (*Saito et al., 2003*).

Angiopoietins (Angs) are promising angiogenic protein growth factors which include four members namely Ang1, Ang2, Ang3 and Ang4. Angiopoietins exert their action through binding to a specific tyrosine kinase receptor named Tie receptor (*Eklund and Oslen, 2006*). Ang1 has been shown to promote the integrity of blood vessels through inhibition of vascular inflammation and suppression of vascular leakage (*Shyu, 2006*). Meanwhile, Ang2 exhibits a context dependent behaviour; in the absence of VEGF, Ang2 promotes vessel destabilization and regression, while in the presence of VEGF, Ang2 stimulates sprouting of new blood vessels (*Haninac et al., 2006*). The effect of Ang3 and Ang4 have been less characterised but they also show

context dependent actions as antagonistic and agonistic ligands respectively (*Eklund and Oslen, 2006*).

The angiopoietin family also plays a crucial role in the pathogenesis of different pathological conditions including, diabetic retinopathy (*Peters et al., 2007*) , arthritis (*Clavel et al., 2007*) and carcinomas (*Caine et al., 2007*).

AIM of THE ESSAY

The aim of the present study is to highlight the different members of angiopoietin family, their structure, mechanisms of action with special emphasis on their role in the pathogenesis of different pathological conditions.