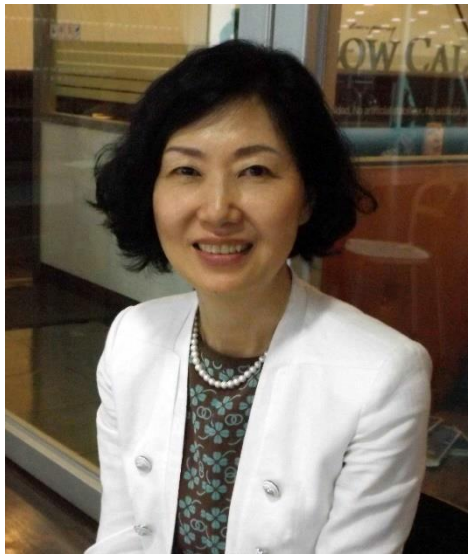
Prof. You Mie Lee, Ph.D

Lab of Vascular Network Research



Research Field : Molecular Pathophysiology
Cancer Biology, Angiogenic Diseases

Present
- Dean, Professor, KNU, College of Pharmacy
- Chairperson, KSMCB (Korea Soc Mol & Cell Biol)
- Chairperson, VSMO (Vascular Sci Medi Org)
- PI, National Basic Research Lab
  (Vascular Homeostasis Regulation)

Career

- **Education** : Seoul National Univ. College of Pharmacy, Bachelor/ Master/ Ph.D
- **Meeting Society** KSPharm, KSMCB, AACR, KSBMB, etc
- **Research** : Tokyo Medical and Dental University, Harvard Medical School, Children's hospital, Research fellow, SNU Research professor
- **Services, etc** : KNU faculty meeting member, Women's Bioscience Forum chairperson nominated by Marquis Who's Who in the World (2009- present)

Research Interest

http://pharmacy.knu.ac.kr/vnrl/

Tumor angiogenesis and its inhibitors

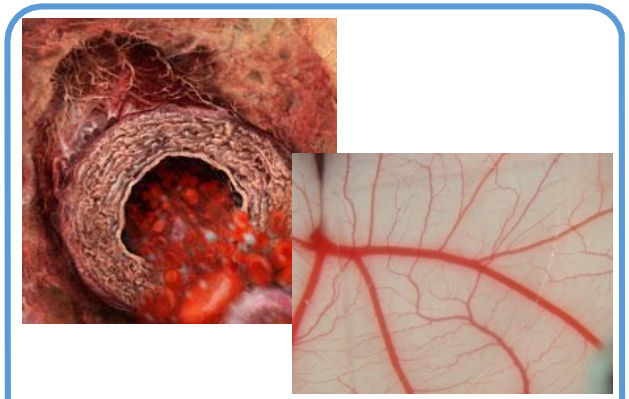
- Regulation mechanism of HIF
- Inhibition of HIF-mediated gene expression
- Development of novel angiogenic inhibitors

Epigenetic regulation in angiogenesis

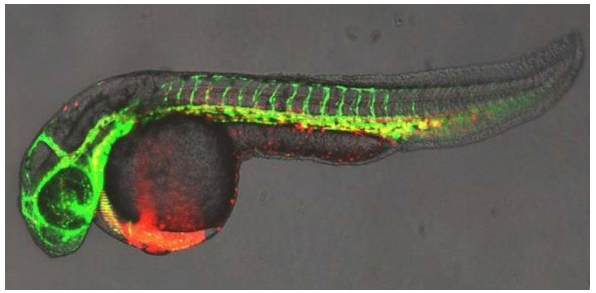
- Epigenetic control of tumor suppressors
- Epigenetic modulators to restore the expressi
  tumor suppressor to inhibit angiogenesis

Endothelial progenitor cells (EPC)

- Differentiation of EPCs derived from bone marrow (BM) and cord blood
- Therapeutic approach to utilize EPCs in angiogenic diseases
- Inhibition of vasculogenic process from BM in tumor angiogenesis



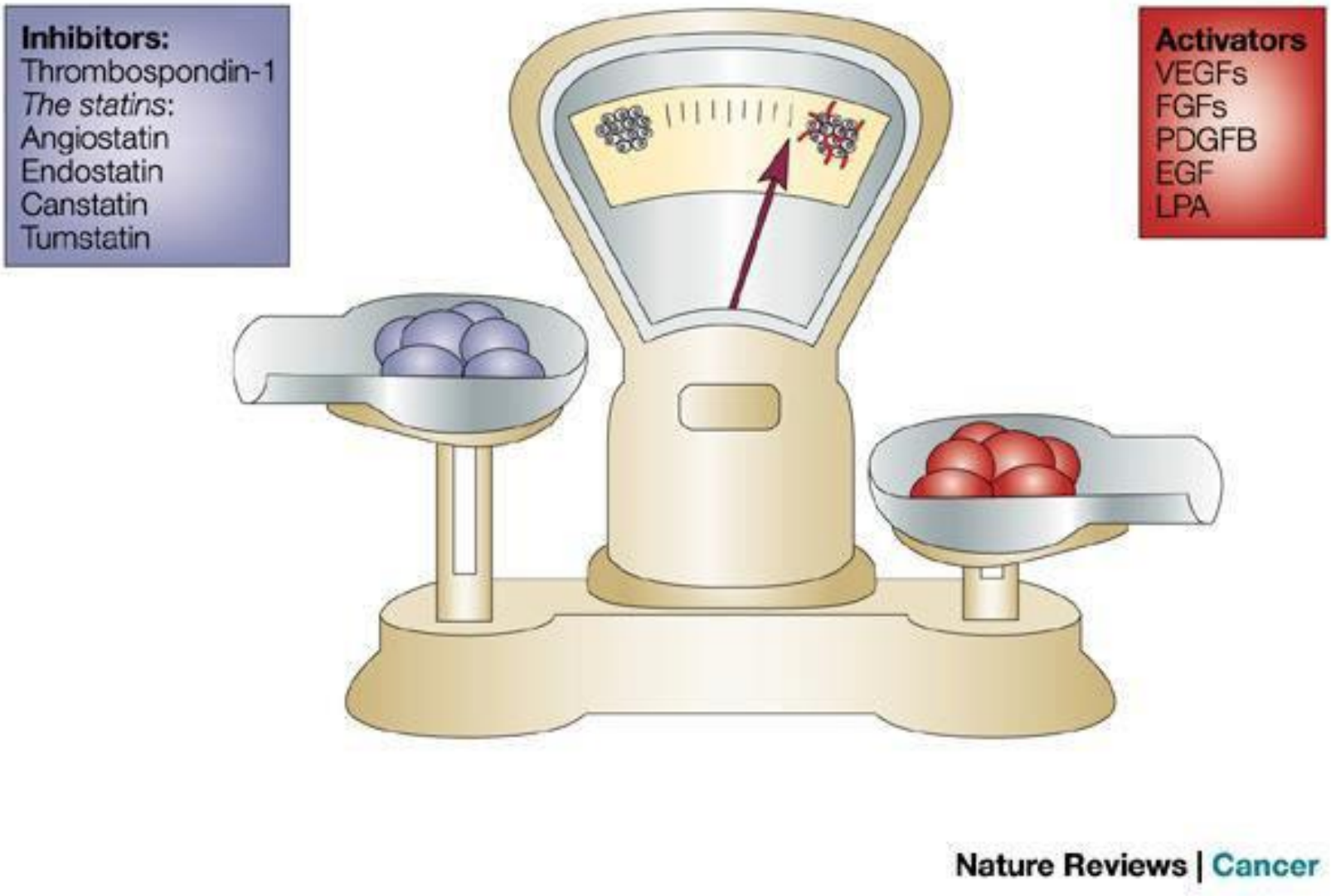
Genetically engineered zebrafish



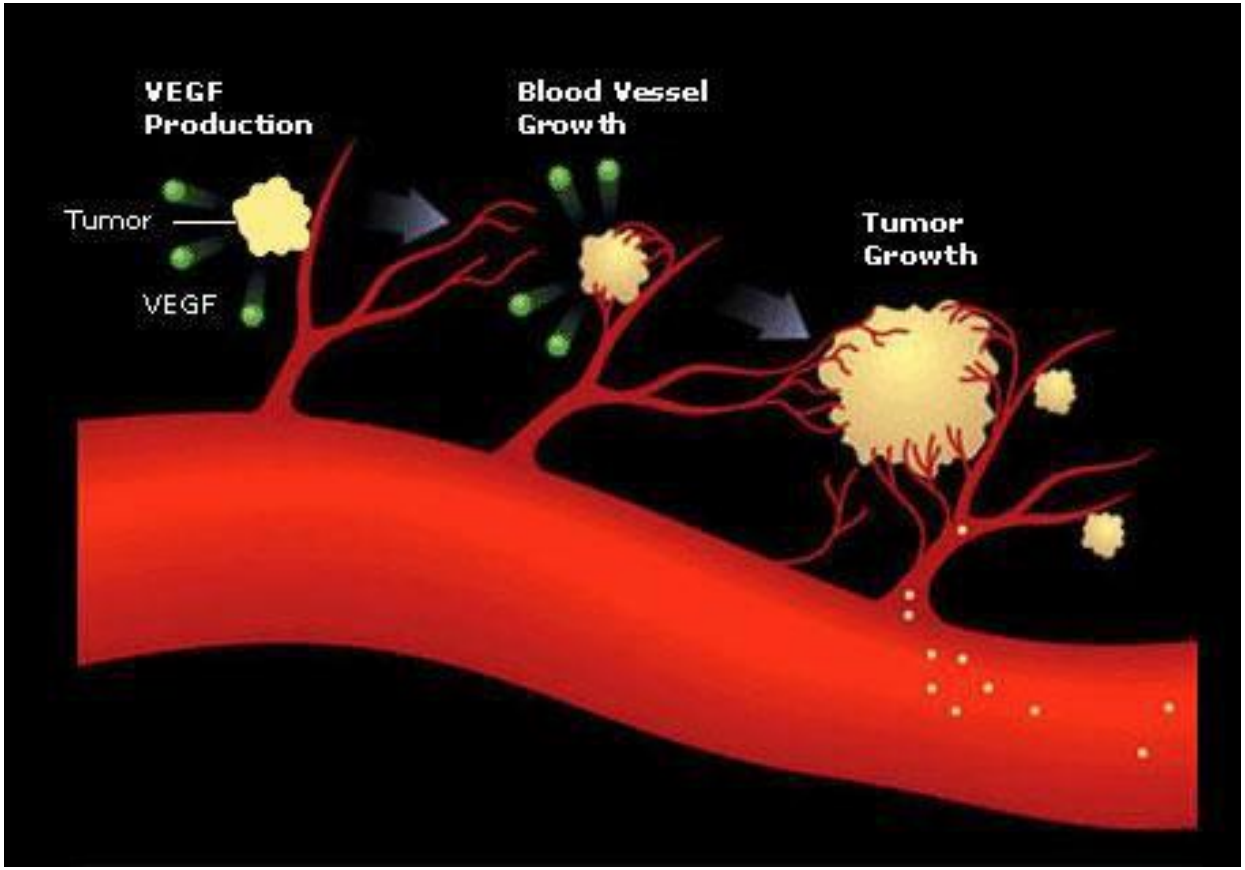
Angiogenic Diseases

Bood vessels	Atherosclerosis, hemangioma, etc.
Skin	Warts, Kaposi sarcoma, Psoriasis, neoplasm
Adipose tissue	Obesity
Bone, joint	Rheumatoid arthritis, synovitis, cancer
Brain, nerves, eye	Diabetic retinopathy, retinopathy of prematurity, vascular dementia
Lymph vessels	tumor metastasis
Haematopoiesis	AIDS, hematologic malignancy

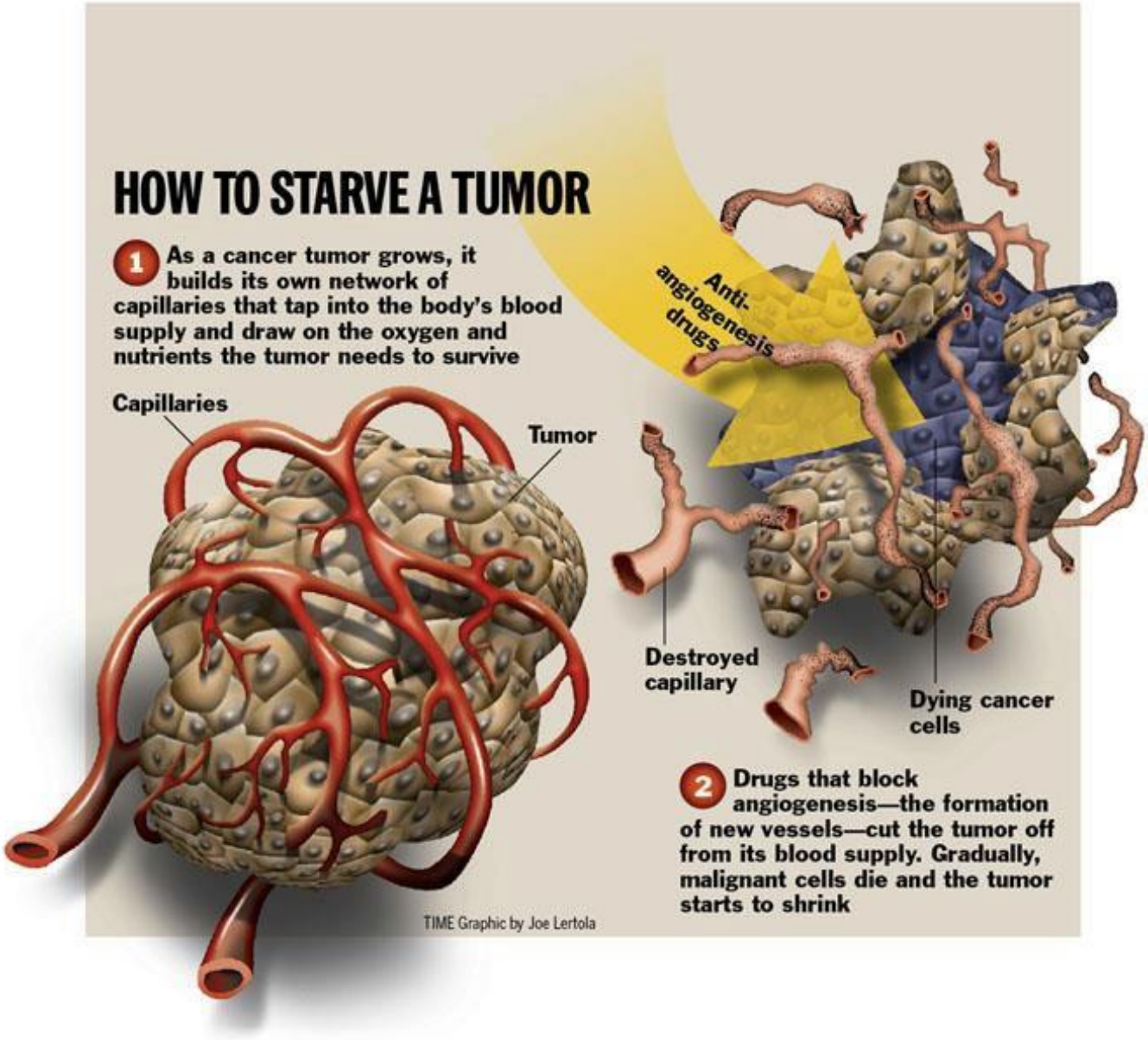
Angiogenic Balance



Tumor growth and angiogenesis



Anti-angiogenic therapy



Angiogenic inhibitors

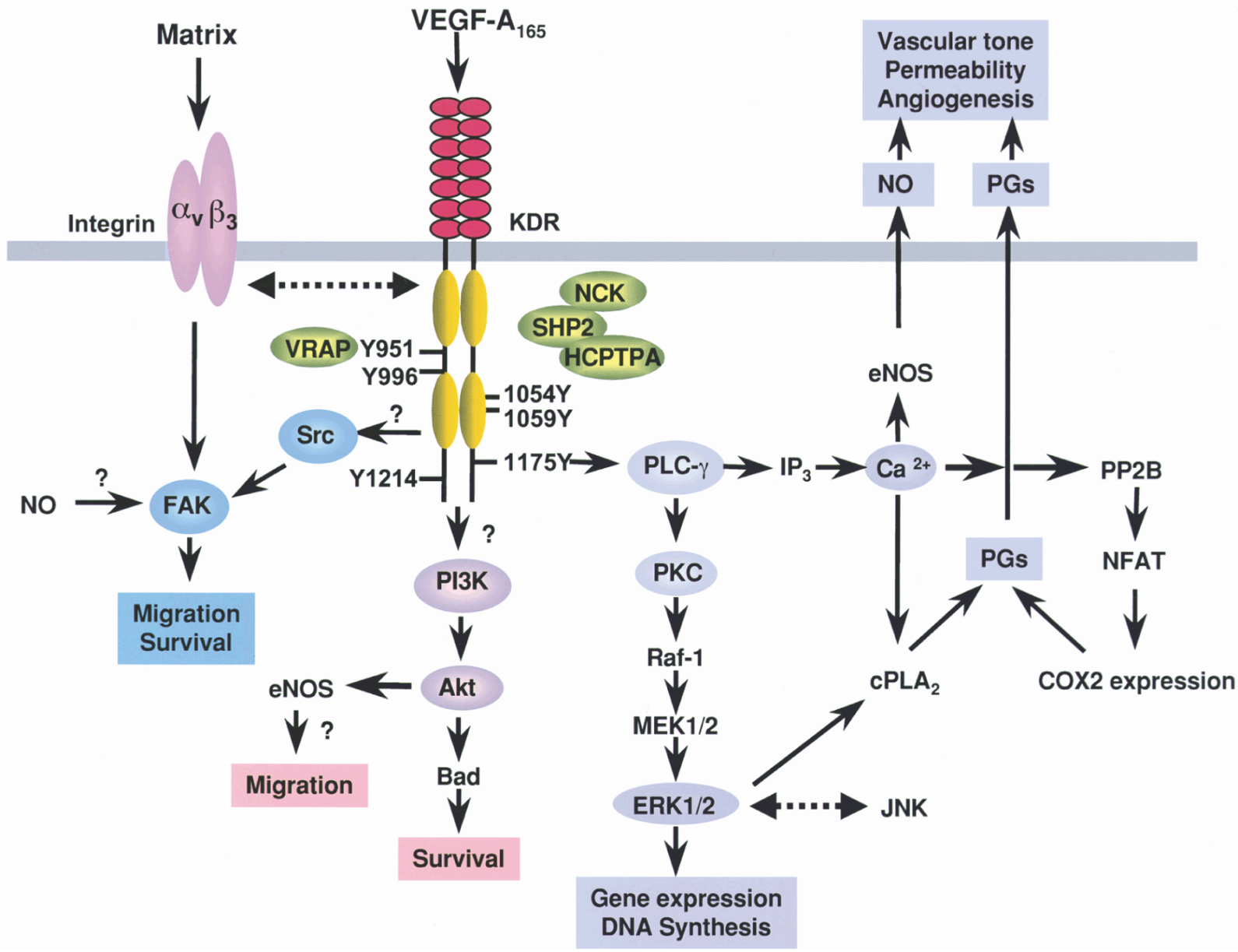
Endogenous (~ 30)

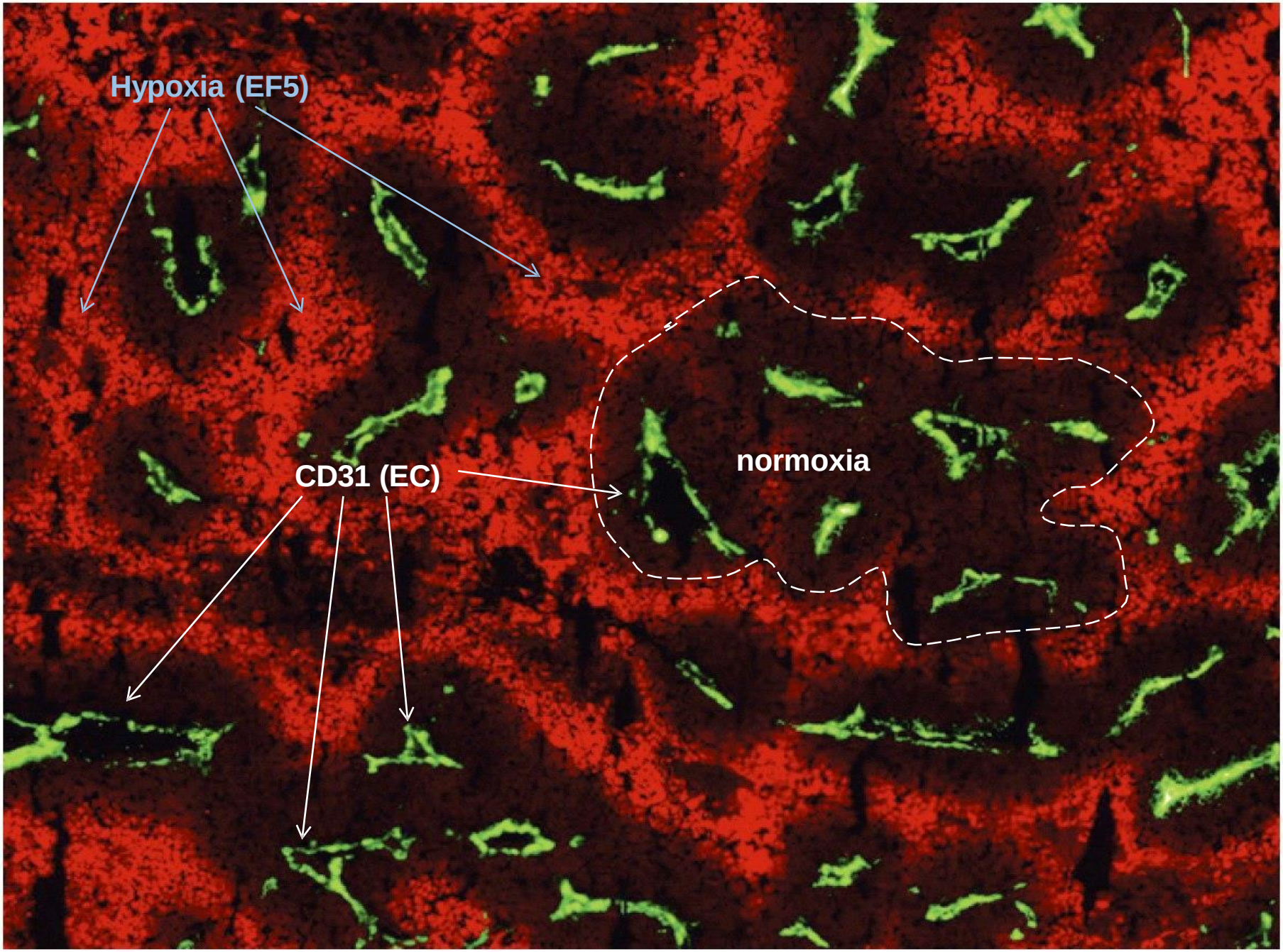
Angioarrestin
Angiostatin (plasminogen fragment)
Cartilage-derived inhibitor (CDI)
Endostatin (collagen XVIII fragment)
Heparinases
hCG
IL12
Kringle 5 (plasminogen fragment)
TIMPs
Plasminogen ativator inhibitor
Retinoids
TSP-1
TGF-β

Natural sources

Tree bark
Fungi (TNP-470)
Shark Muscle and Cartilage
Sea coral
Green tea
Herbs
Soybean

VEGF signaling pathway

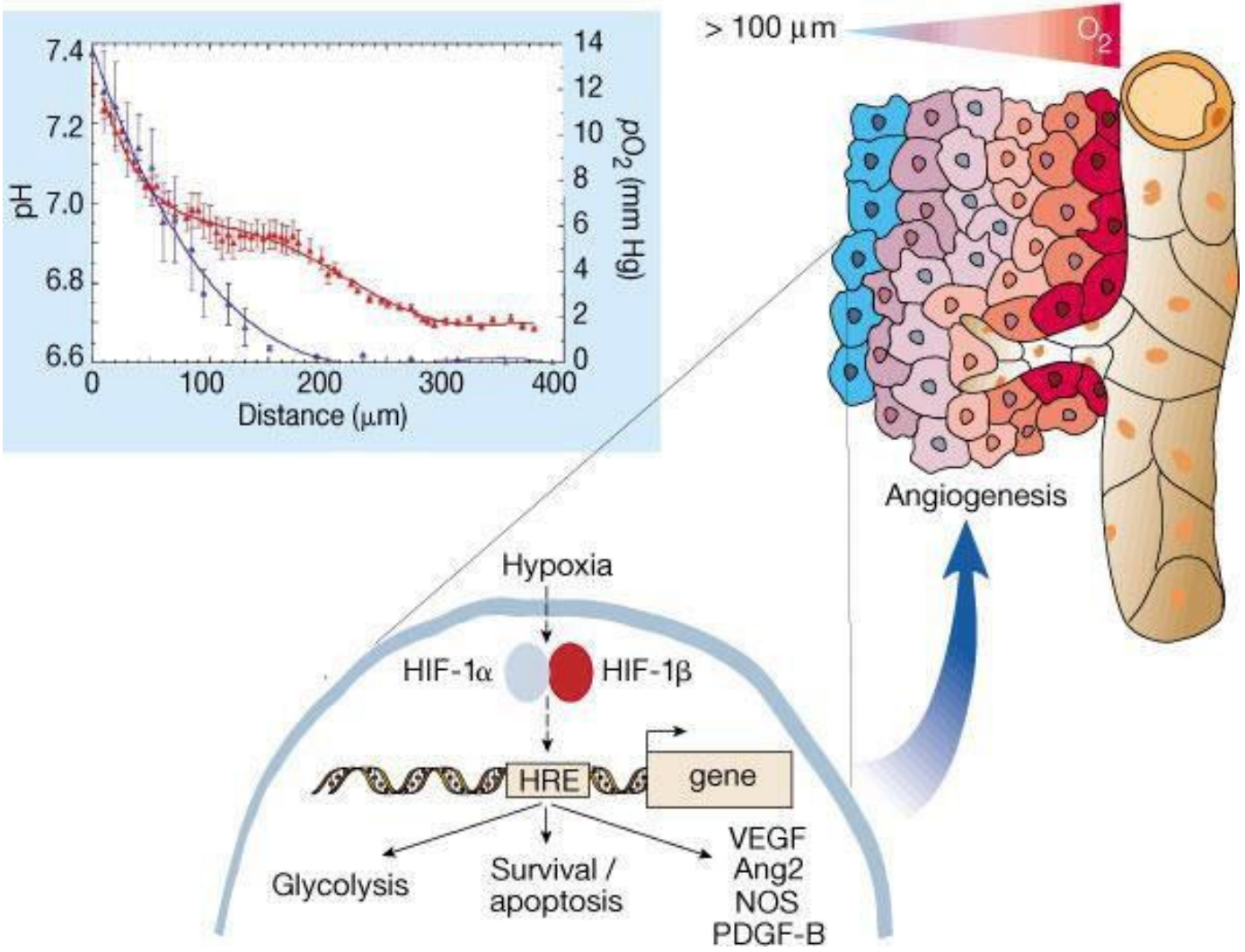




EF-5 (hypoxic marker),

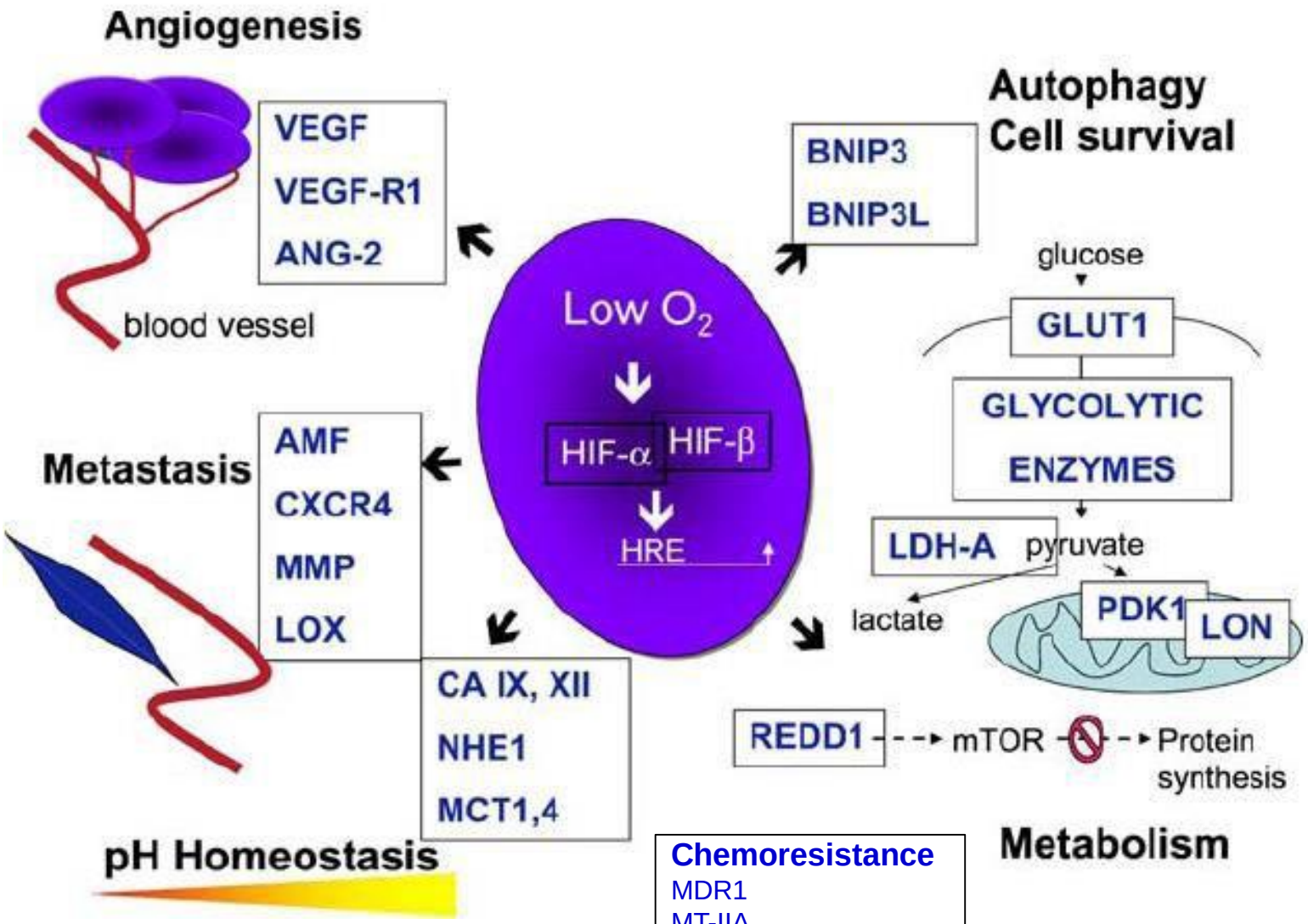
Weinberg R, The Biology of Cancer, 2007

Hypoxic microenvironment in tumor



Nature 407:249-257, 2000

Role of HIF-1 in cancer cell responses



Chemoresistance
MDR1
MT-IIA
CA9

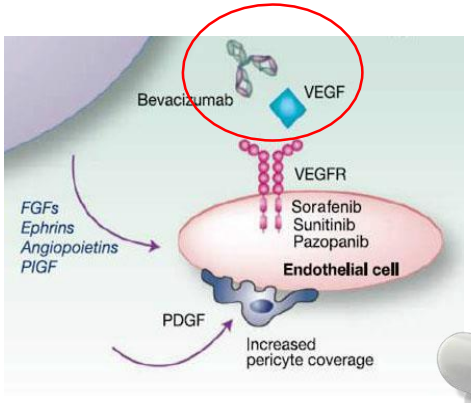
J Mol Med (2007) 85:1301-1307

Angiogenesis

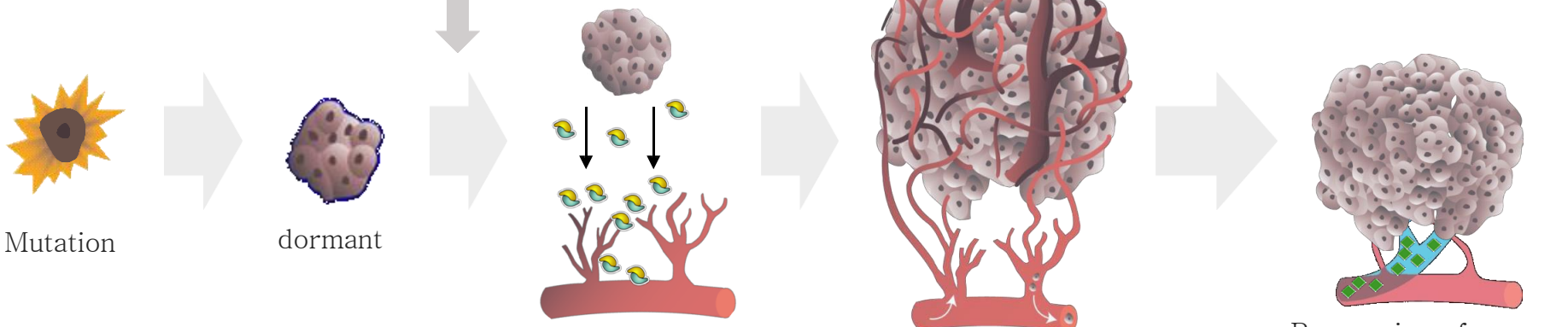
Hypoxia
(저산소 미세환경)

HIF-1

VEGF



10 billion $/year
(Roche®)



Mutation

dormant

Secretion of angiogenic factors

Rapid
growth of
cancer

Regression of cancer

= **Proangiogenic factor, eg. VEGF**

= **Angiogenic inhibitor**

Carmeliet and Jain. Nature. 2000

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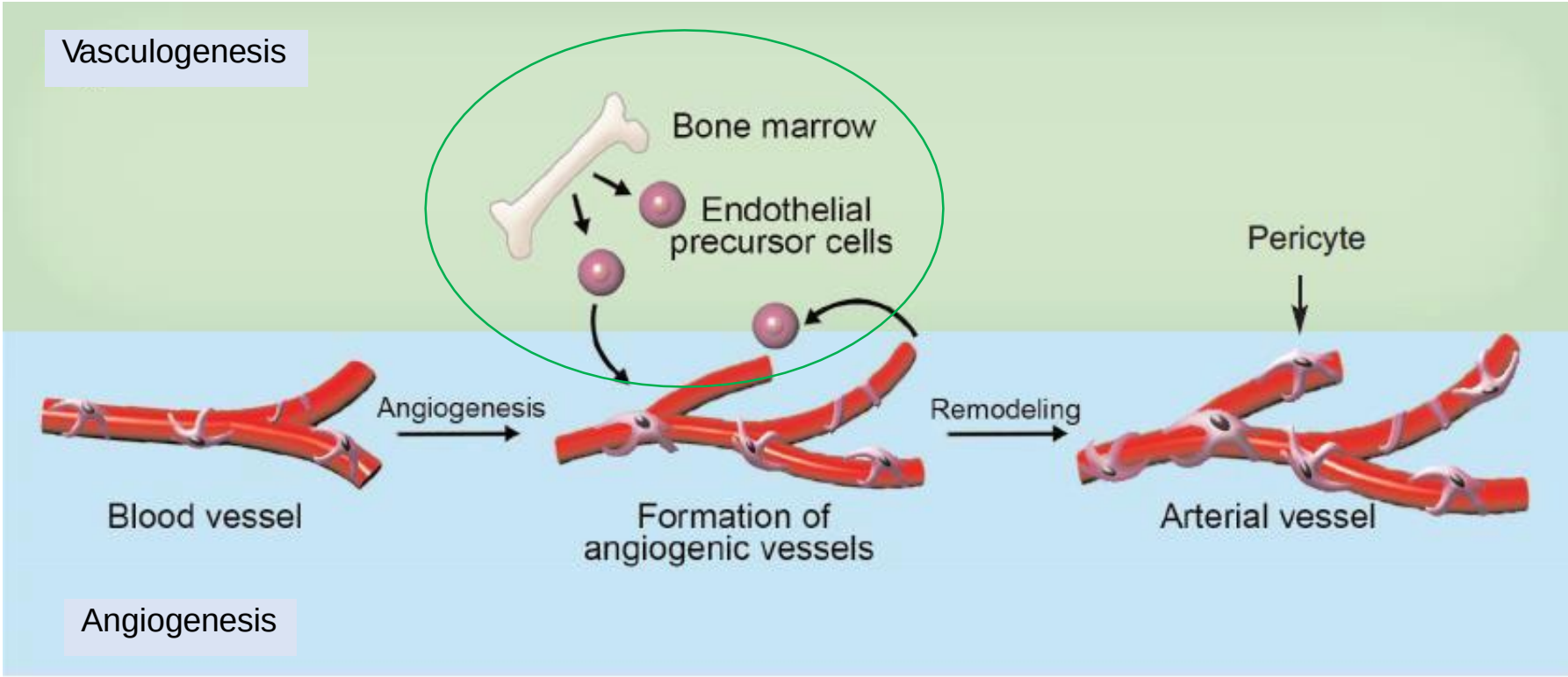
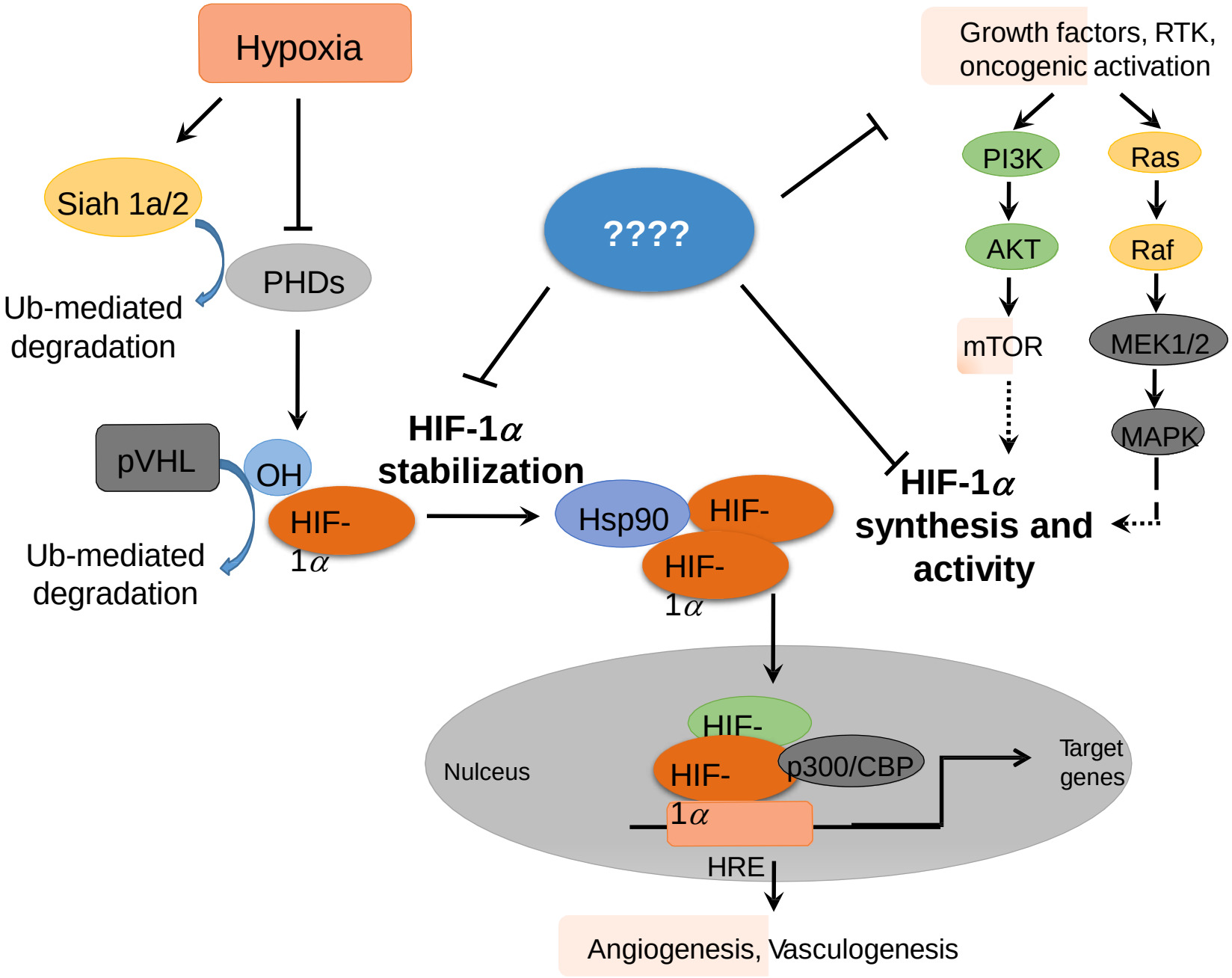
Vasculogenesis vs. Angiogenesis

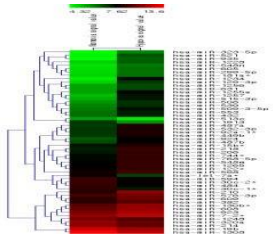


Inhibitors of HIF-1 in tumor angiogenesis



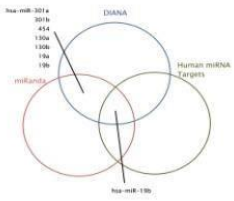
Research Approach

Hypoxia-induced genes



-DNA chip
-Proteomics

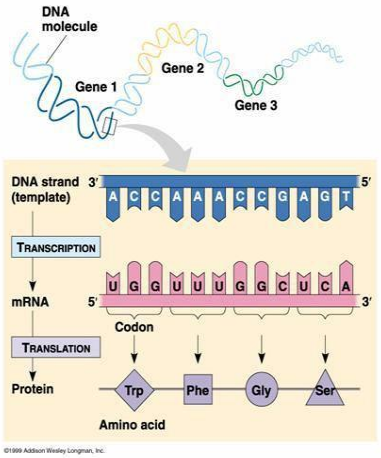
Computer
Analysis

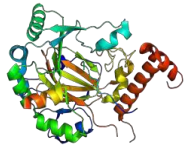


Gene
finding

Mechanism of HIF expression

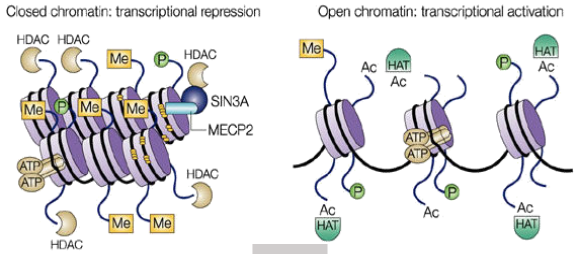
A, B, C, ….X





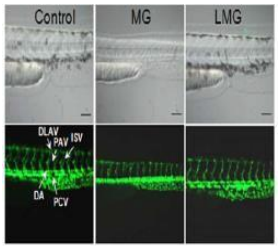
HIF

<Epigenetic regulation>

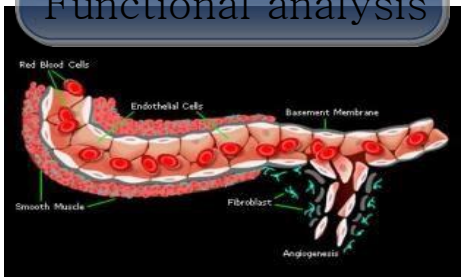


Finding of regulatory molecules

Confirm with K/O or K/D animals



Functional analysis



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