Advancement of Epigenetics in Stroke Research

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Abstract

With the advancement of epigenetic tools and technologies associated with intervention medicine, stroke research has entered into a new fertile, dynamic era of epigenetic studies, a wide plethora of intervention procedure, administration of tissue plasminogen activator, the introduction of mechanical thrombectomy, clinical studies, and drug developments over the last decennium. Against this vivid background of newly emerging pieces of knowledge, there is little to none advancement in the overall outcome of the disease. The stroke involves an overabundance of inflammatory responses arising in part due to the body's immune response to brain injury. Neuroinflammation contributes to significant neuronal cell death and the development of functional impairment and death in stroke patients. Recent studies demonstrated epigenetic plays a key role in the overall outcome of the disease. In this review, we summarize the progress of epigenetics which provides an overview of recent advancements on the emerging key role of epigenetics over the last decade contributing to the regulation of neuroinflammation in stroke, potential epigenetic targets that might be key factors in the development of stroke therapies and their relation in respect to clinical practice.

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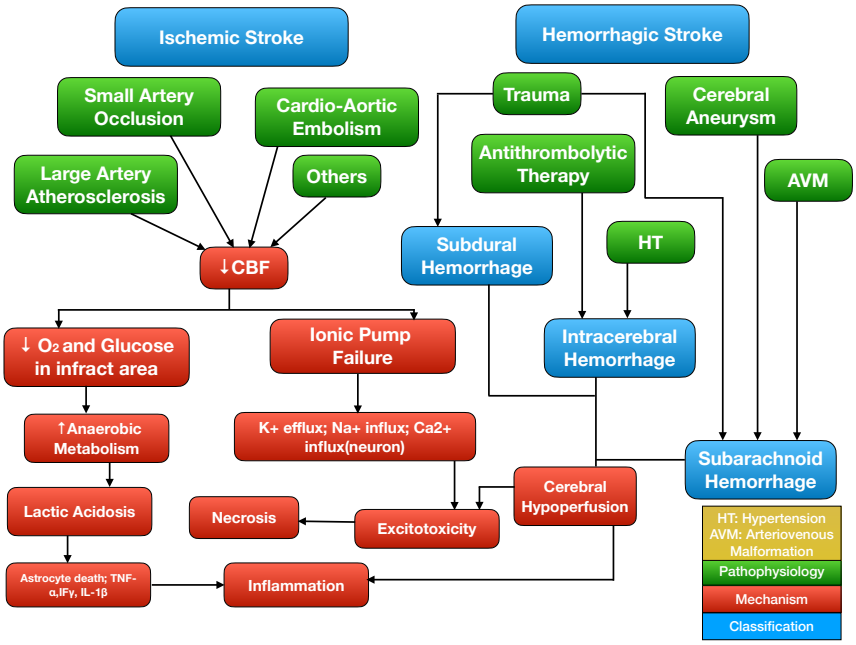
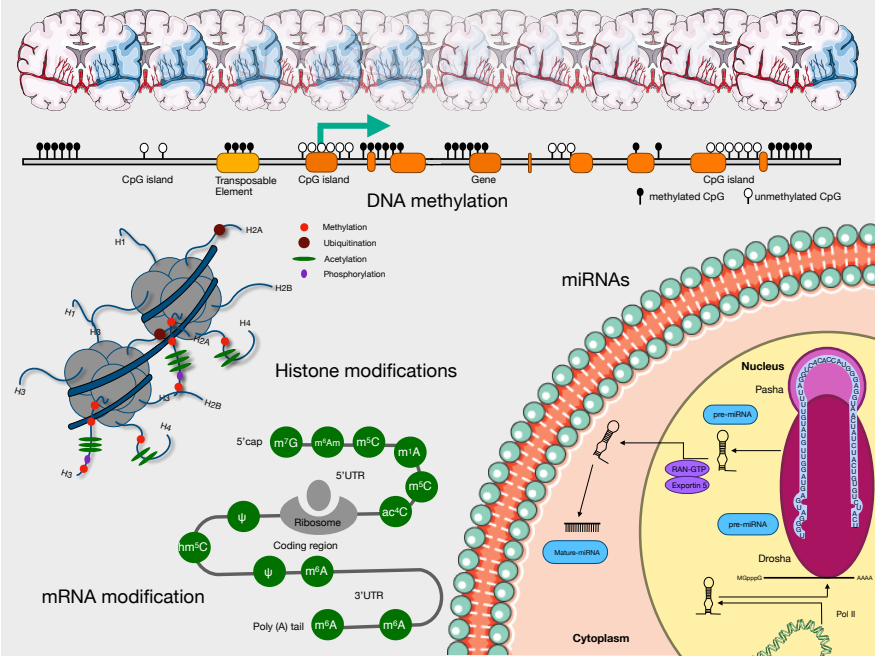
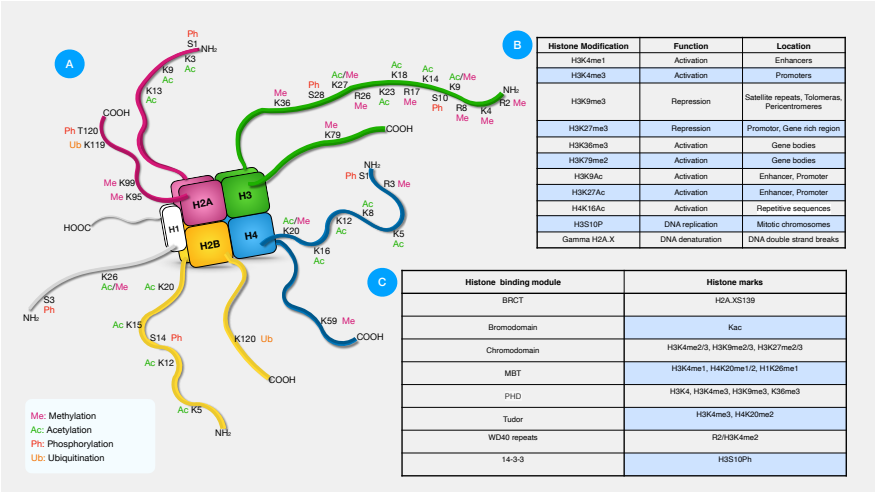
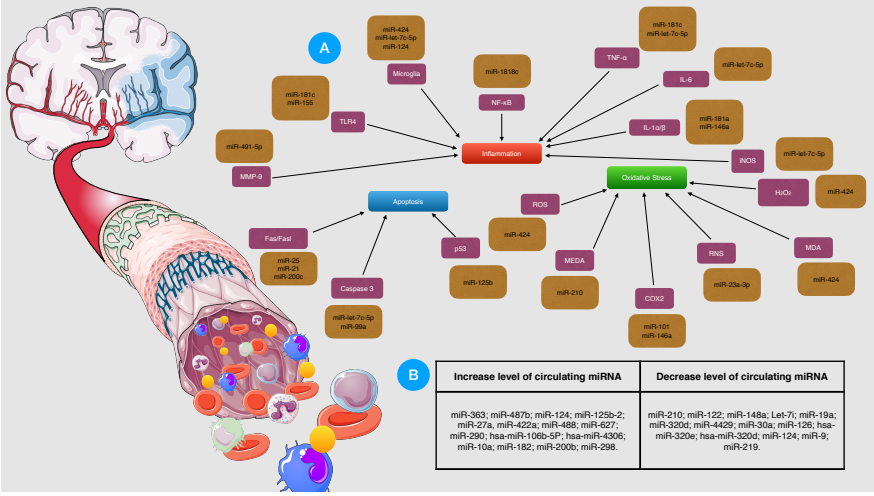


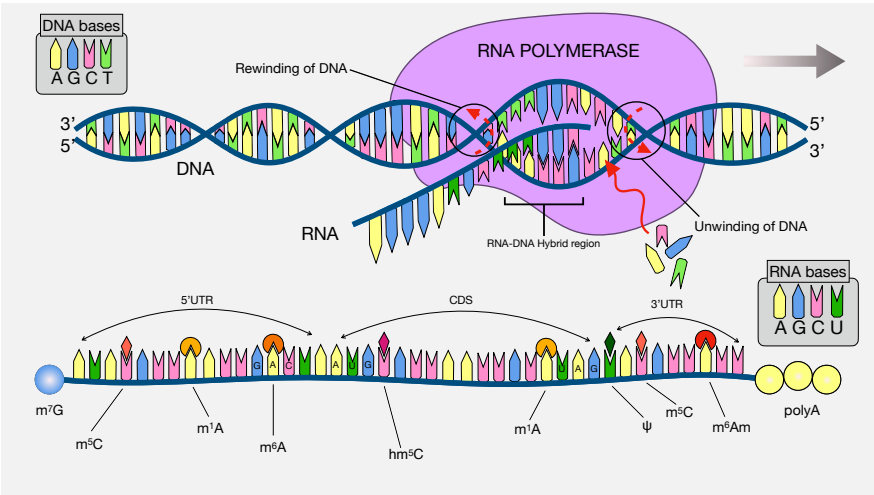




Histone Modification	Function	Location
H3K4me1	Activation	Enhancers
H3K4me3	Activation	Promoters
H3K9me3	Repression	Satellite repeats, Tolomeras, Pericentromeres
H3K27me3	Repression	Promotor, Gene rich region
H3K36me3	Activation	Gene bodies
H3K79me2	Activation	Gene bodies
H3K9Ac	Activation	Enhancer, Promoter
H3K27Ac	Activation	Enhancer, Promoter
H4K16Ac	Activation	Repetitive sequences
H3S10P	DNA replication	Mitotic chromosomes
Gamma H2A.X	DNA denaturation	DNA double strand breaks

Histone binding module	Histone marks
BRCT	H2A.XS139
Bromodomain	Kac
Chromodomain	H3K4me2/3, H3K9me2/3, H3K27me2/3
MBT	H3K4me1, H4K20me1/2, H1K26me1
PHD	H3K4, H3K4me3, H3K9me3, K36me3
Tudor	H3K4me3, H4K20me2
WD40 repeats	R2/H3K4me2
14-3-3	H3S10Ph





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