OGHENEOVO AKPEVWE SERENA

17/MHS02/064

BCH204

ASSIGNMENT

1.StepsofDNAreplication

TherearethreemainstepstoDNAreplication:initiation,elongation,and termination

‘Inordertofitwithinacell’snucleus.DNAispackedintotightlycoiledstructurescaled chromatin,whichloosenspriortoreplication,alowingthecelreplicationmachinerytoaccess theDNAstrands.

BeforeDNAreplicationcanbegin,thedoublehelixstructureoftheDNAmoleculeshastobe ‘unzipped.’Helicase,anenzyme,isintegraltothisprocess,breakingthehydrogenbondsthat holdthecomplementarybasesofDNAtogether(AwithTandCwithG).Theseparationcreates a‘Y’shapecaledareplicationforkandthetwosinglestrandsofDNAnowactastemplatesfor makingnewstrandsofDNA.

Next,theSingle-StrandedDNABindingProtein(SSBProtein)bindstothenowsingle-stranded DNA,preventingtheseparatingstrandsfrom joiningagain.

Thetwostrandsofthedouble-helixDNAarejoinedtogetherbycross-bars,twistedaround.For thistowork,eachDNAstrandrunsinoppositedirection

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Oneofthestrandsisorientedinthe3’to5’direction(towardsthereplicationfork),thisisthe leadingstrand.Theotherstrandisorientedinthe5’to3’direction(awayfrom thereplication fork),thisisthelaggingstrand.

2.OUTLINETHEFUNCTIONSOFDNAREPLICATIONENZYMES

Enzyme- - Function

Topoisomerase - Relaxesthesuper-coiledDNA

DNAhelicase. - Unwindsthedoublehelixatthereplicationfork

Primase - ProvidesthestartingpointforDNApolymerasetobeginsynthesisofthe newstrand

DNApolymerase - SynthesizesthenewDNAstrand;alsoproofreadsandcorectssome erors

DNAligase-Re-joinsthetwoDNAstrandsintoadoublehelixandjoinsOkazaki fragmentsofthelaggingstrand