



المملكة العربية السعودية
جامعة الملك سعود

جامعة الملك سعود

كلية العلوم

قسم الكيمياء الحيوية

كيمياء حيوية عامة (BCH 101) الأحماض النووية NUCLEIC ACIDS

الحامض النووي الريبوزي RNA

١- حامض نووي ريبوزي رسول m-RNA

٢- حامض نووي ريبوزي ناقل t-RNA

٣- حامض نووي ريبوزي ريبوسومي r-RNA

المبدأ المركزي للجينات الجزيئية Central Dogma of Molecular Genetics

البروتينات



RNA



DNA

تضاعف الـ DNA

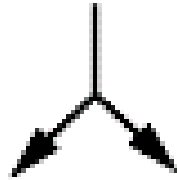
- التضاعف شبه المحافظ Semiconservative Replication
- التضاعف ثنائي الاتجاه Bidirectional Replication
- التضاعف شبه المتواصل Semidiscontinuous replication

Parent
molecule

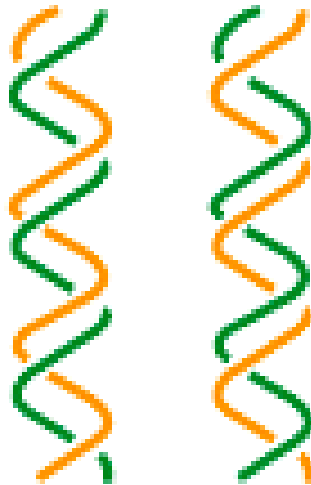


DNA replication is
semiconservative

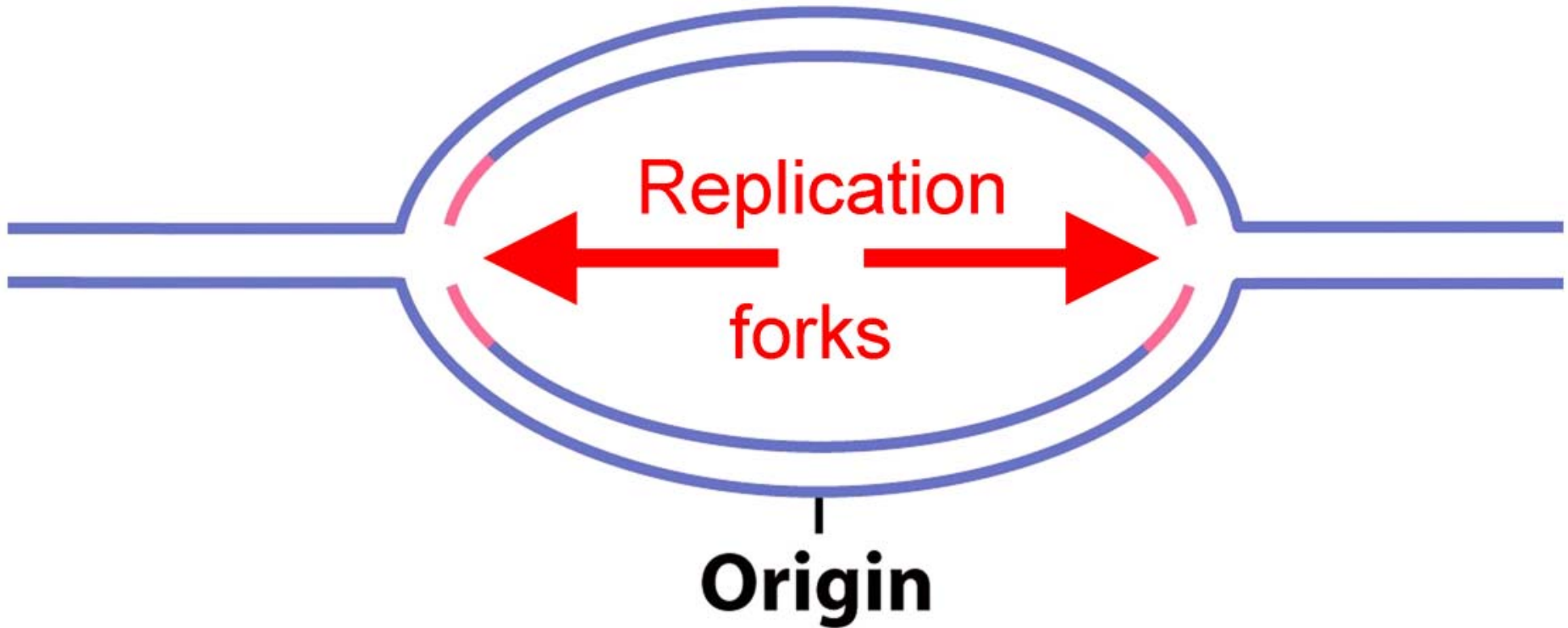
Replication



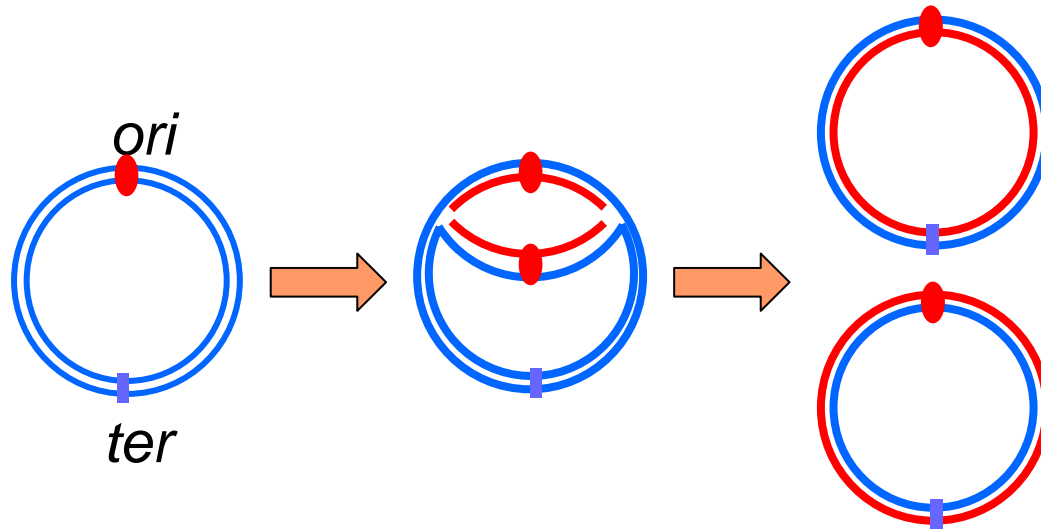
Daughter
molecules



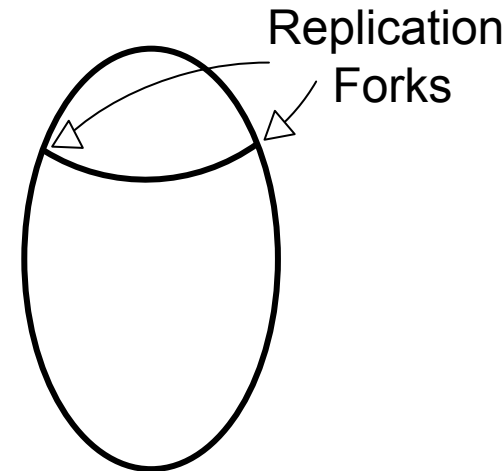
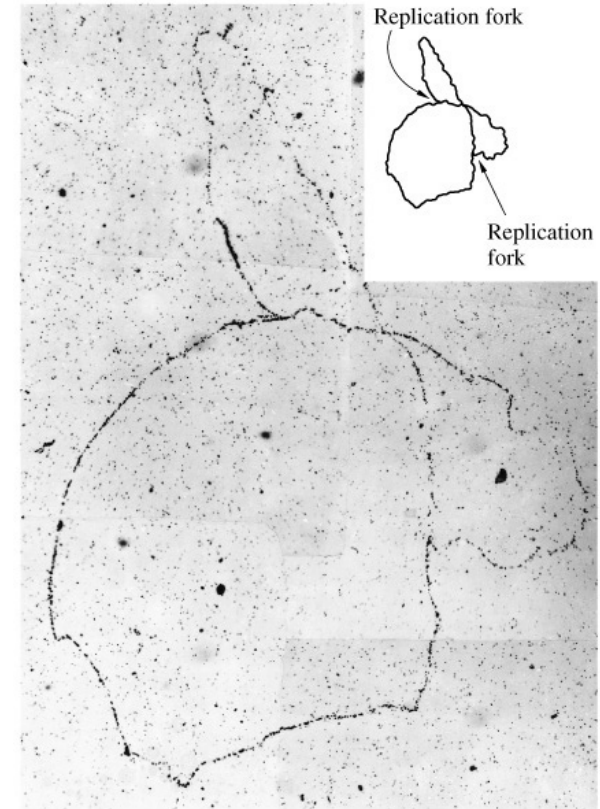
Bidirectional DNA replication



Procaryotic (Bacterial) Chromosome Replication

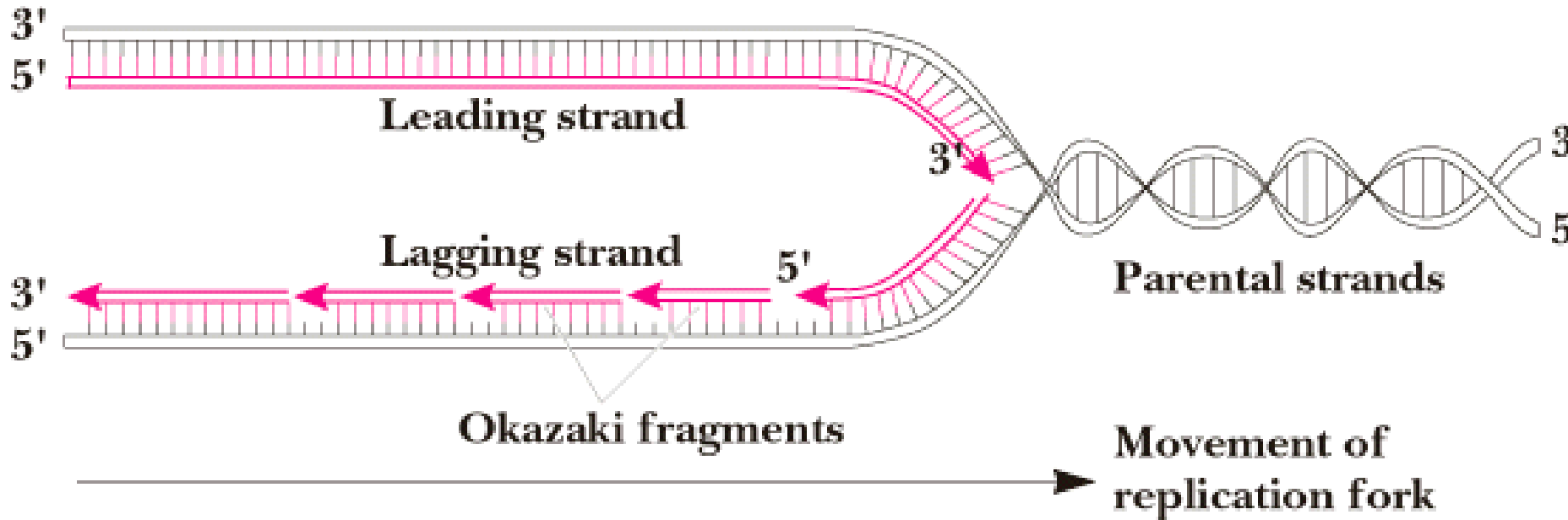


***Bidirectional Replication Produces
a Theta Intermediate***

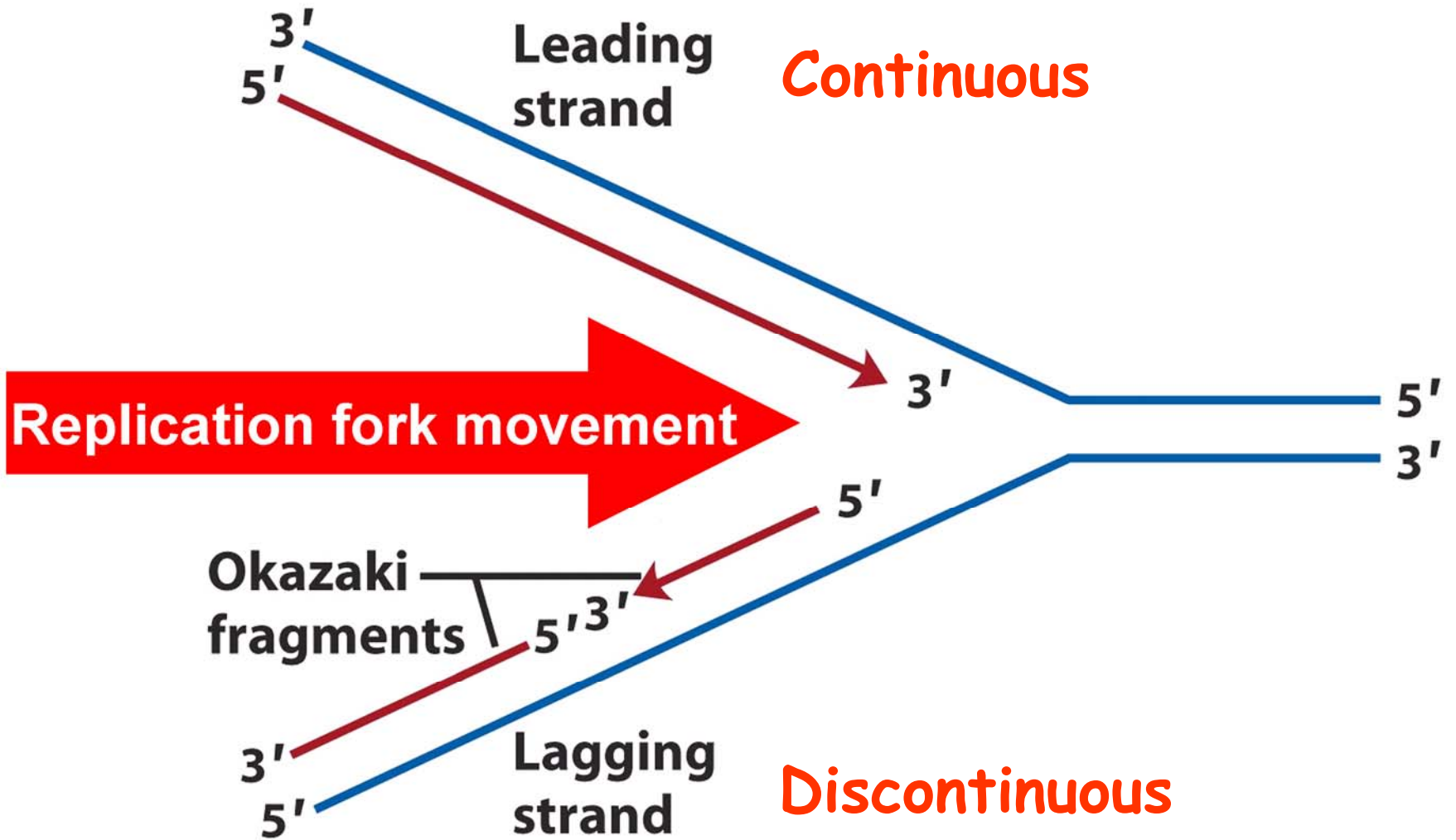


DNA Replication is Semi-discontinuous

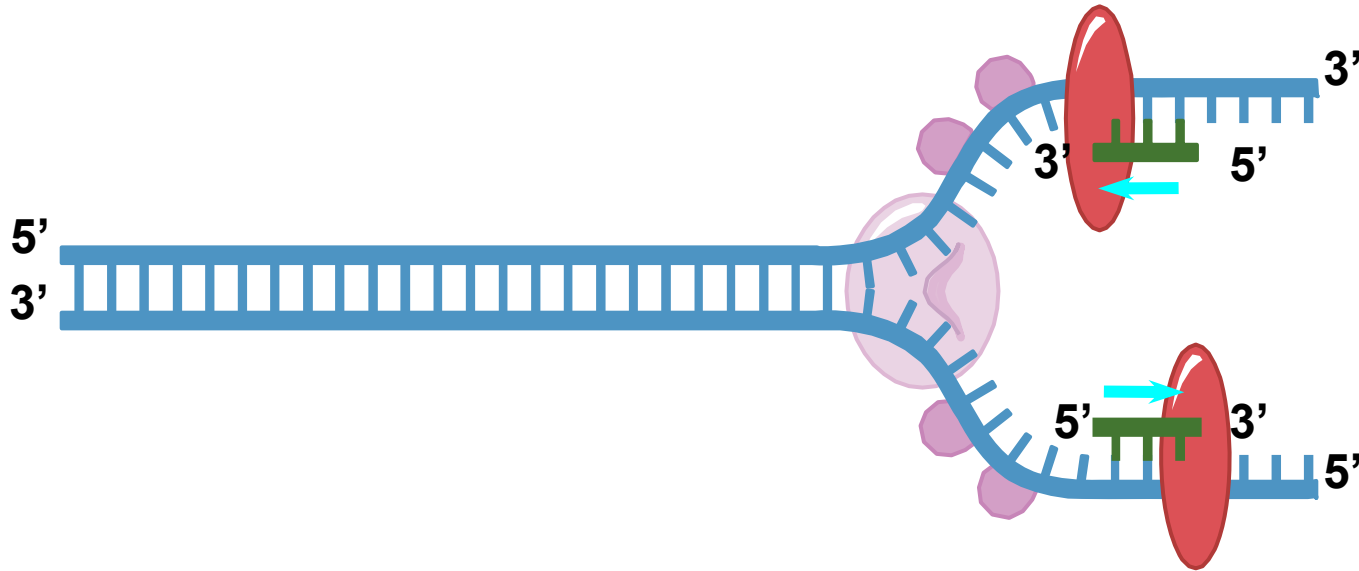
Continuous synthesis



Discontinuous synthesis



Replication

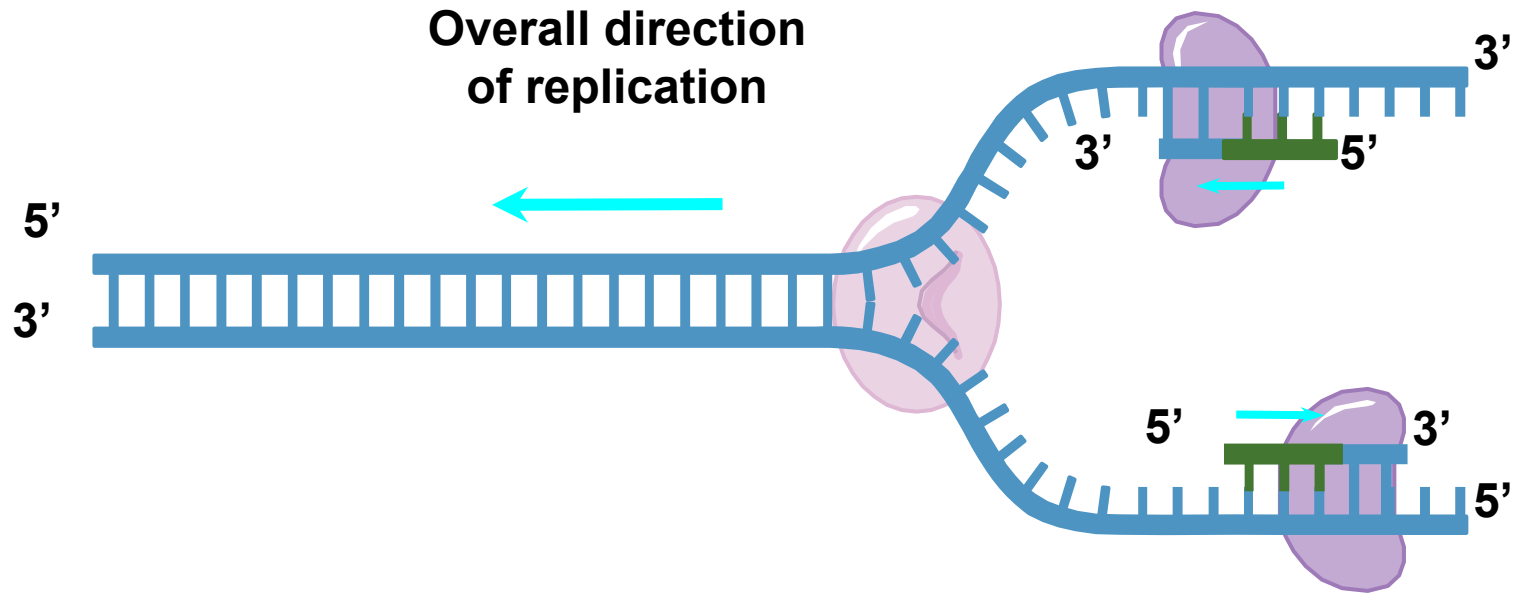


Helicase protein binds to DNA sequences called origins and unwinds DNA strands.

Binding proteins prevent single strands from rewinding.

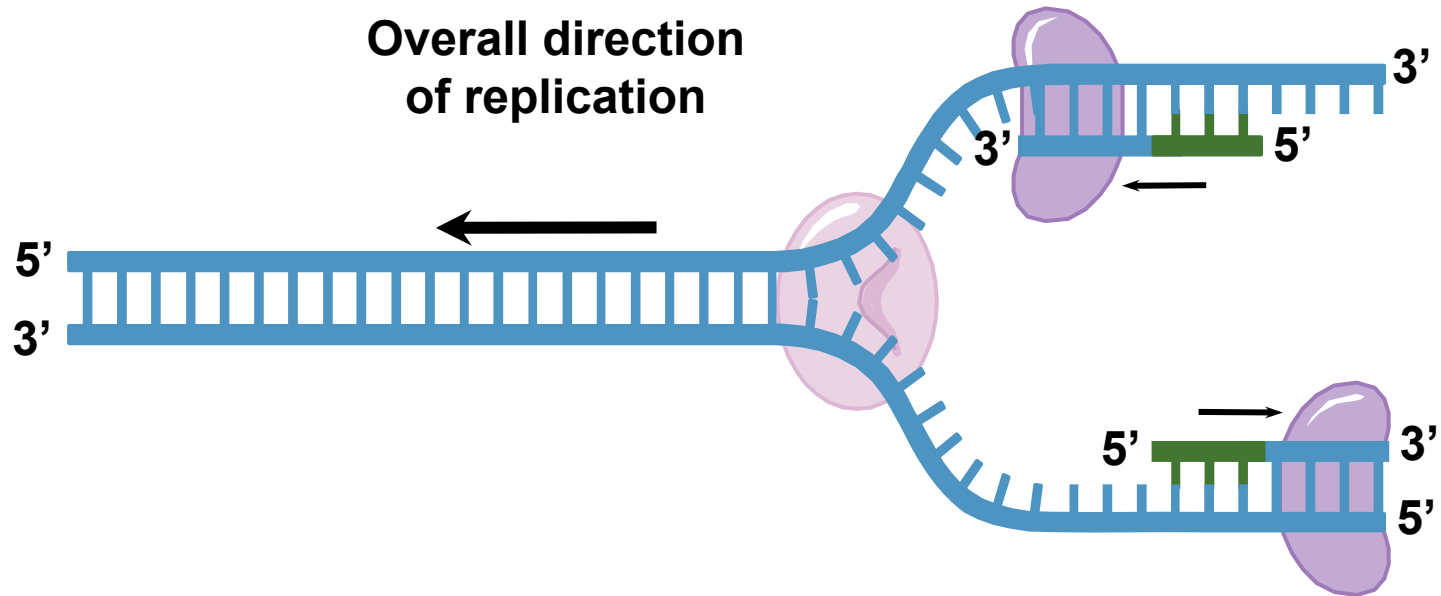
Primase protein makes a short segment of RNA complementary to the DNA, a primer.

Replication



DNA polymerase enzyme adds DNA nucleotides to the RNA primer.

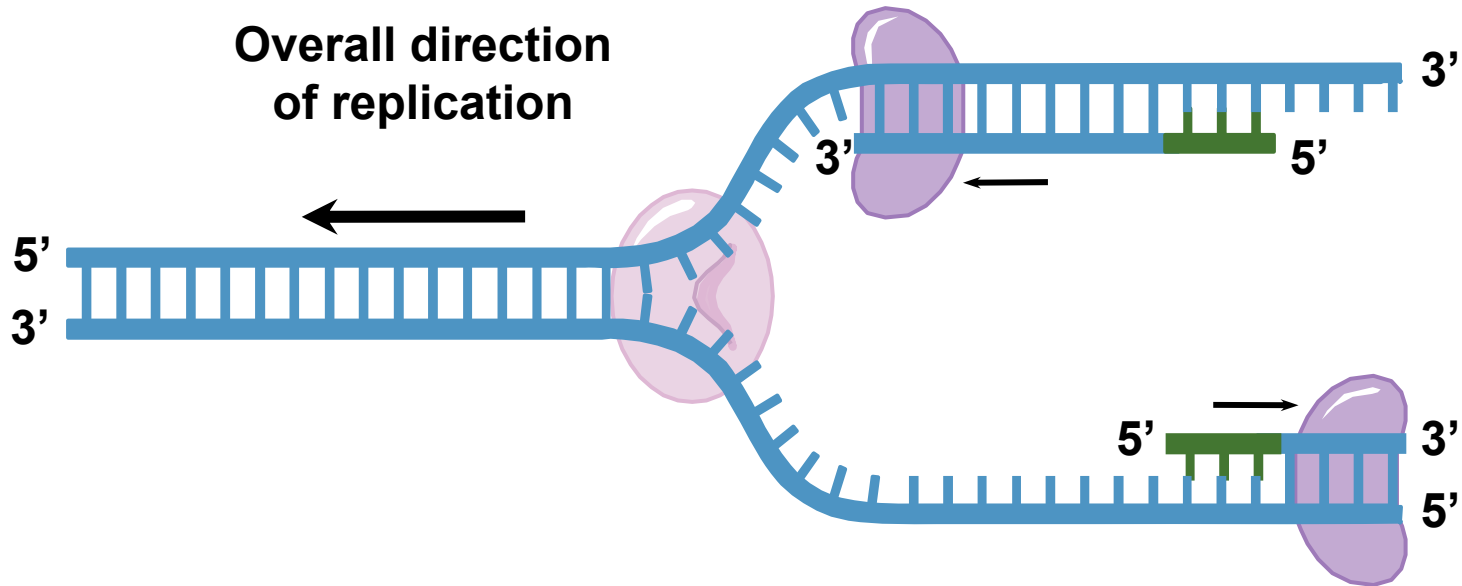
Replication



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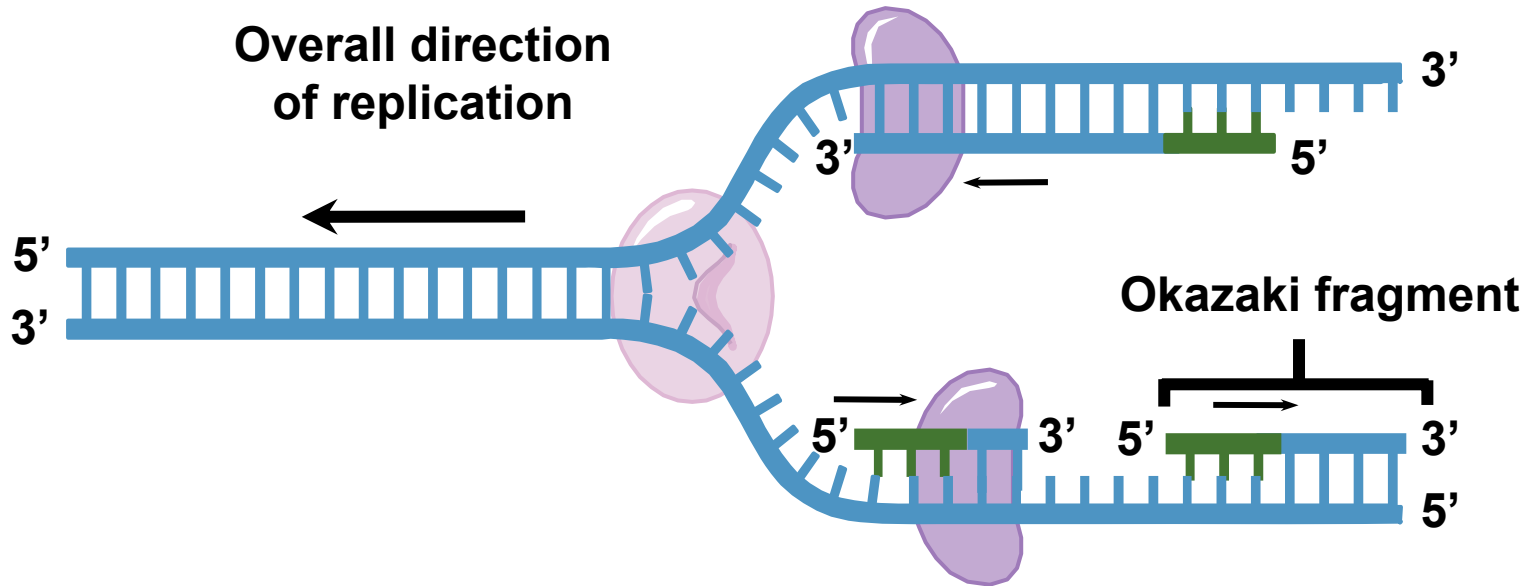
DNA polymerase proofreads bases added and replaces incorrect nucleotides.

Replication



Leading strand synthesis continues in a 5' to 3' direction.

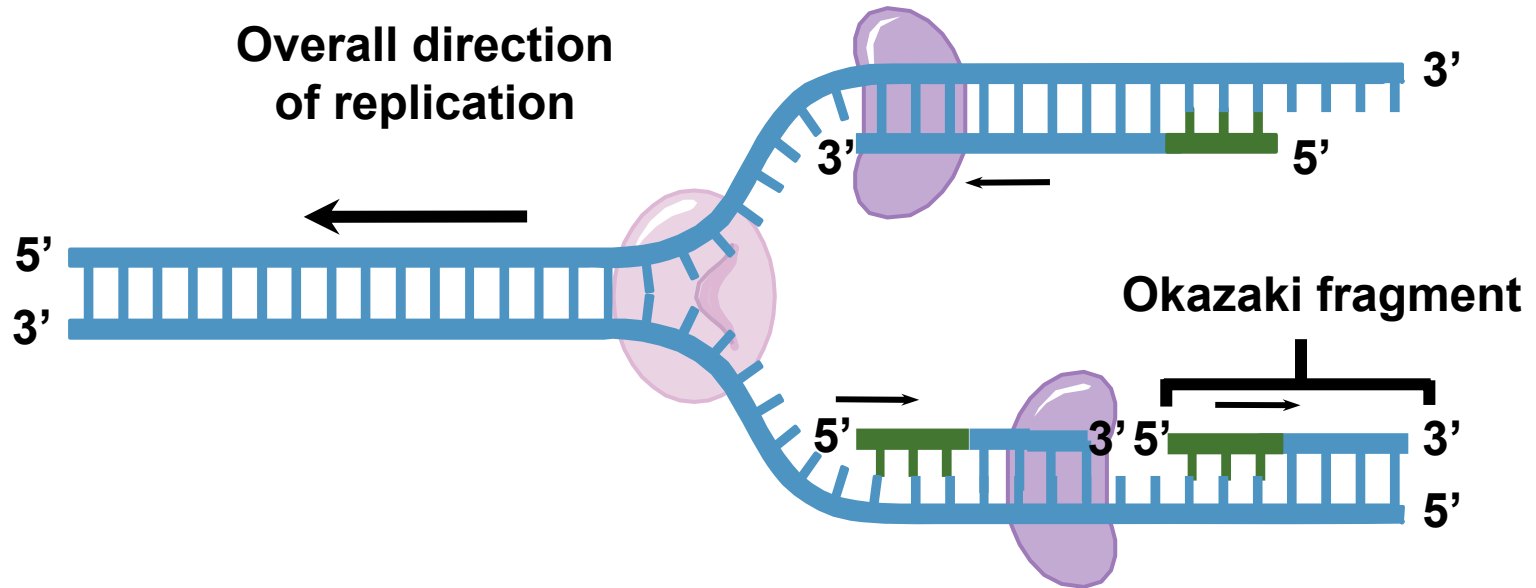
Replication



Leading strand synthesis continues in a 5' to 3' direction.

Discontinuous synthesis produces 5' to 3' DNA segments called Okazaki fragments.

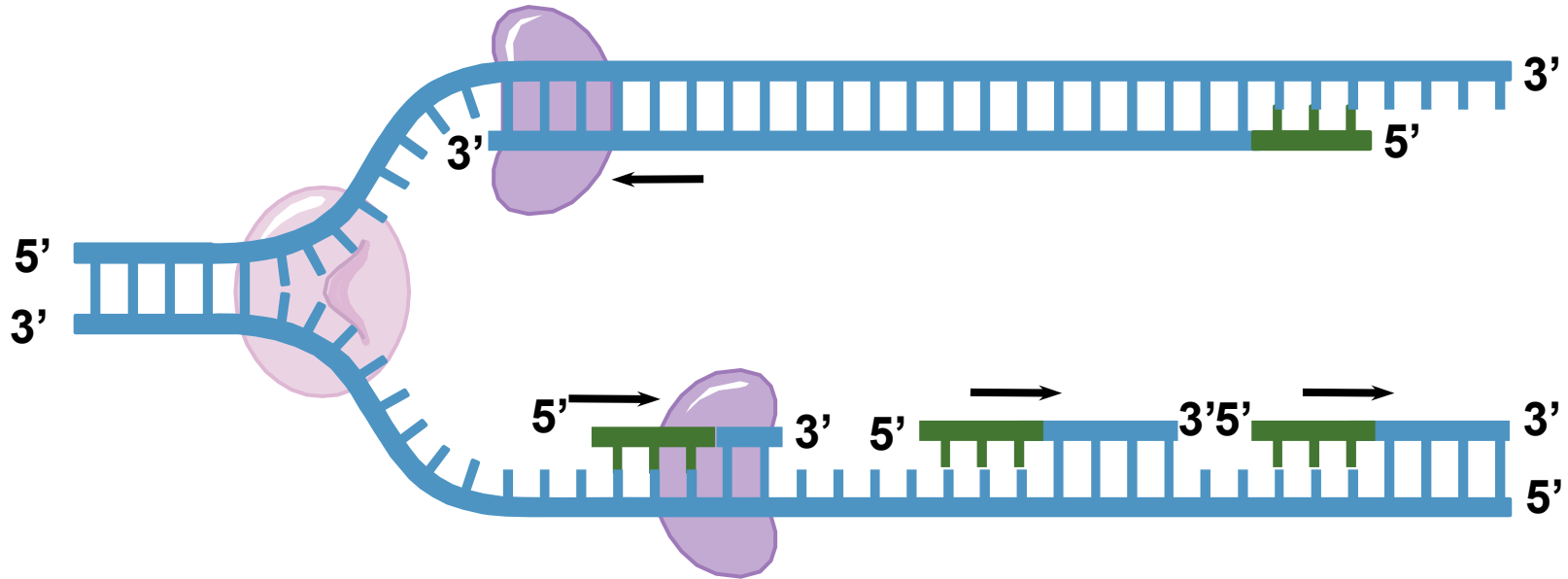
Replication



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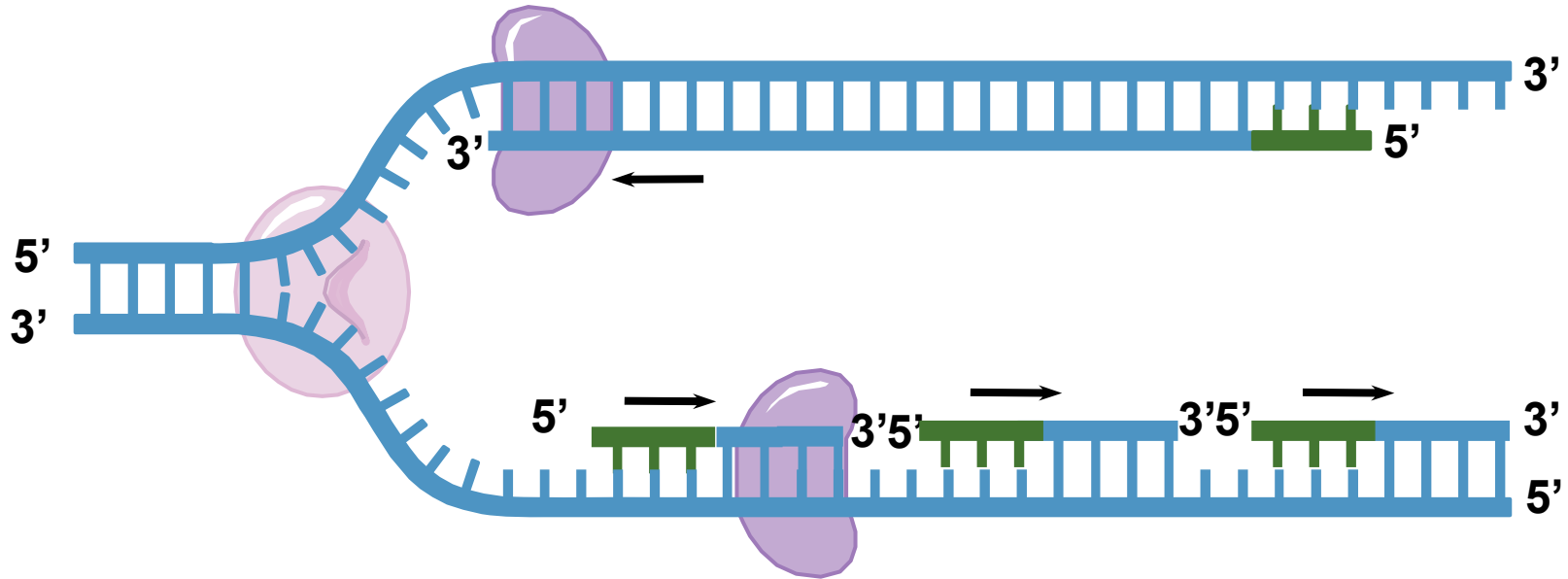
Replication



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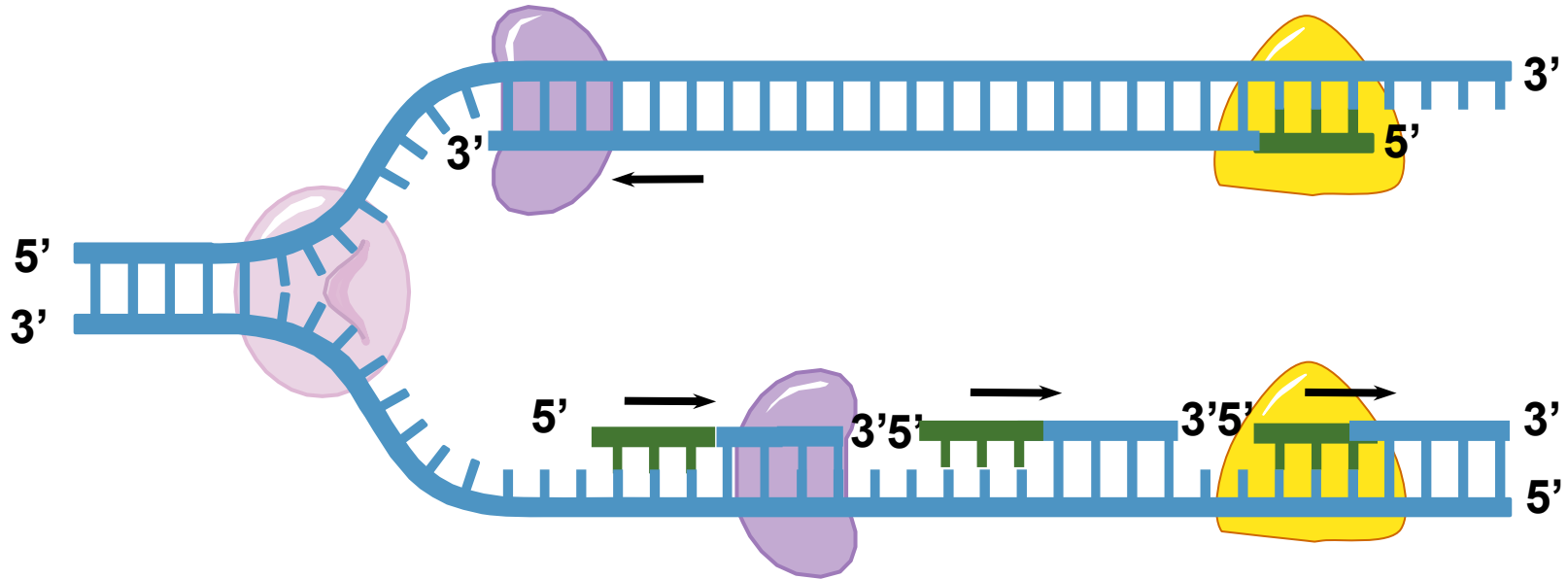
Replication



Leading strand synthesis continues in a 5' to 3' direction.

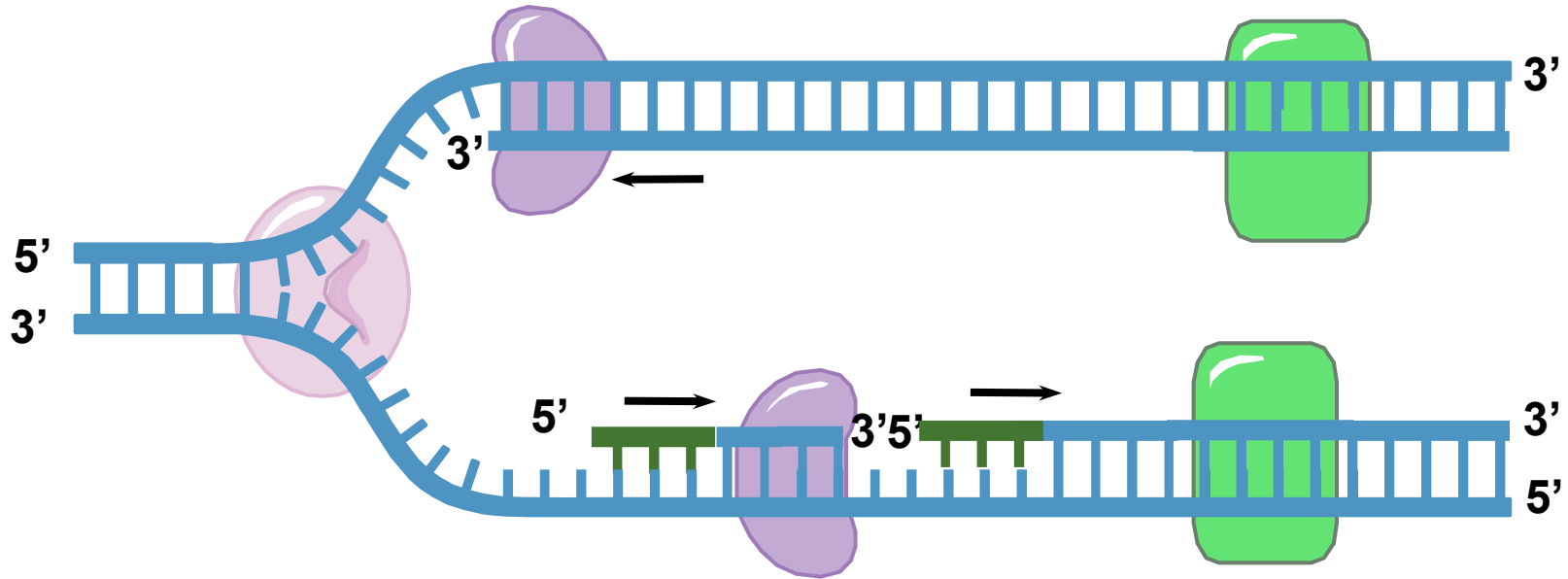
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Replication



Exonuclease activity of DNA polymerase I removes RNA primers.

Replication



Polymerase activity of DNA polymerase I fills the gaps.

Ligase forms bonds between sugar-phosphate backbone.

أنواع إنزيم البوليميريز

- DNA polymerase I
- DNA polymerase II
- DNA polymerase III

فك ارتباط الحلزون المزدوج

- توبو أيزوميريز أو DNA gyrase

Transcription

