

## Template MC Question Cell Cycle Chapter 3

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<b>Title</b>	<b>How to replicate once and only once? The pre-replicative complex.</b>
<b>Introduction/ Description</b>	<b>Cells have to ensure that they replicate their genome exactly once before they start mitosis. This highly regulated process involves the temporarily separated formation and firing of the pre-replicative complex (preRC). The large preRC assembles in a stepwise manner and requires different replication factors.</b>
<b>Question</b>	<b>Which of the following statements regarding preRC formation and firing is correct?</b>

Choice sheet - As the material will serve as a study aid, please put the correct answer randomly as one of the 4 choices.

<b>Choice 1</b>	<b>The preRC component Cdc6 is activated by Cdc28-Cln by phosphorylation. As Cln is only present during G1, this phosphorylation ensures that preRC assembly can only be performed in G1.</b>
<b>Choice 2</b>	<b>After initiation of DNA replication, all the components except Mcm of the preRC dissociate from the origin of replication. Mcm remains bound to the origin of replication until the elongation process is finished.</b>
<b>Choice 3</b>	<b>The protein Geminin is able to inhibit the preRC formation in animal cells by blocking the Cdt1 activity. The recruitment of the Mcm complex onto the DNA is inhibited as a consequence of the blocking.</b>
<b>Choice 4</b>	<b>Firing of all ORIs in eukaryotic cells ensures that the entire genome is replicated before entering the M-Phase. The firing depends on the cell status and on the environment.</b>

Feedback sheet – Please **label** the feedback to the choices as “CORRECT” or “INCORRECT”. Provide detailed feedback to explain why the choice was correct or incorrect.

Feedback Choice 1	<b>INCORRECT: preRC components do not need phosphorylation as activation. Contrary phosphorylation leads to inactivation. The preRC complex is formed in the G1 phase before the Cdc28-Clns become active and phosphorylate the pre-RC components.</b>
Feedback Choice 2	<b>INCORRECT: Mcm is involved in DNA elongation and travels ahead of the replication fork after initiation of DNA replication.</b>
Feedback Choice 3	<b>CORRECT</b>
Feedback Choice 4	<b>INCORRECT: not all ORIs are used for firing.</b>

Source: Script Cell Cycle by Prof. Yves Barral