Abstract

Within the process of cell division, genetic material must be equally distributed between the two daughter cells. In the next phase, the missing portion of the genome must be synthesized. The entire cycle is regulated by cyclin-dependent kinases (Cdks) in cooperation with cyclins. If the DNA is damaged during the cell cycle, signaling pathways of checkpoints supress cycle progression and enforce the cell cycle arrest until the damage is repaired. Malfunction of the checkpoints results in tumorigenesis. Polo-like kinases (Plks) are, much like Cdks, important regulators of the cell cycle. Plks play significant role mainly in the mitosis and also in a response to the DNA damage. This thesis is focused on human homologues, nevertheless conservation of homologues among organisms is considerable, thus presented findings are of general relevance. Human cells express five proteins from the family of Polo-like kinases, from which Plk1 corresponds to Polo-like kinases of lower eukaryotes. Knowledge on the remaining four kinases is still on the rise.