**Course: Advance Bio Informatics**

**Module Title: Regulation of the Cell Cycle**

**Module No: 153**

**Regulation of the Cell Cycle**

* All the phases of cell cycle (G1, S, G2, M) are tightly regulated.
* S phase is the highly significant phase because it is a phase of DNA synthesis and replication.
* Progression of the cell cycle is regulated by the activity of cyclins and cyclin-dependent kinases (Cdks)
* Cell has to divide or not at a certain point is decision point.
* A decision point called restriction point.
* If the cell is damaged, the cycle is arrested for recovery.

**Cell Cycle Regulator**

It is controlled by some regulatory protein. Cyclin B1 is the extensively studied regulator in human cells. It is expressed at the time of entry of cells from G2 phase to M phase

**Cyclins and Cyclin dependent protein kinases**

Cyclins are unable to perform their function unless they complex with Cdks.

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| **Cyclin** | **Cdks** | **Active phase** | **Function** |
| D | Cdk4,Cdk6 | Late G1 | Retinoblastoma protein inactivated to repress transcription of certain genes |
| E | Cdk2 | Late G1 | Initiation of DNA synthesis |
| A | Cdk2 | S phase | Cdk2 complexes with cyclin A;  Completion of DNA synthesis |
| B | Cdk1 | Late G2/M | Rate limiting for transition of the cell cycle from G2 to M phase |