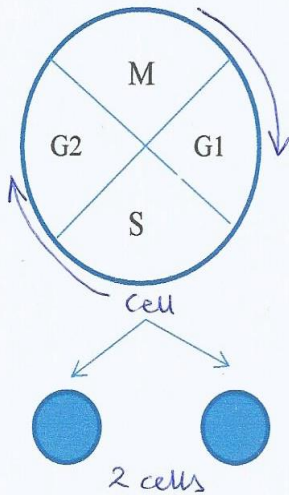


**Unit II – Problem 7 – Pharmacology: Principles of Cancer Chemotherapy**

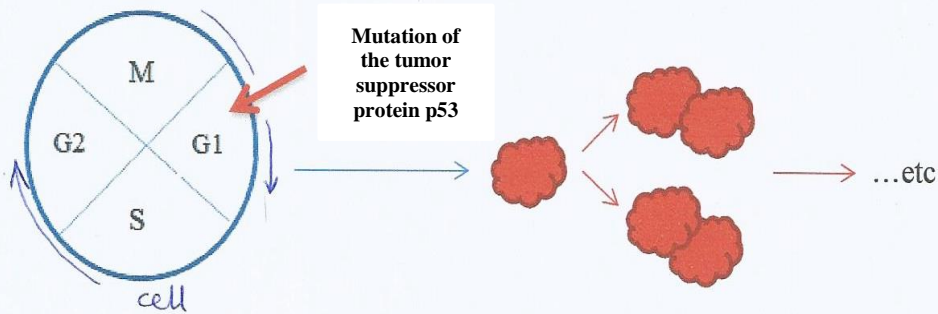
**Introduction to cell cycle (molecular biology):**

**Normally:**



- **G1:** Synthesis of cellular components needed for DNA synthesis.
- **S:** DNA synthesis (Replication of the DNA genome).
- **G2:** Control of synthesized DNA & preparation for division.
- **M:** Mitosis.
- **G0:** Resting phase → fates:
  - ✓ Repair and complete cell cycle.
  - ✓ Apoptosis.
  - ✓ Stay there (muscles and nerve cells)

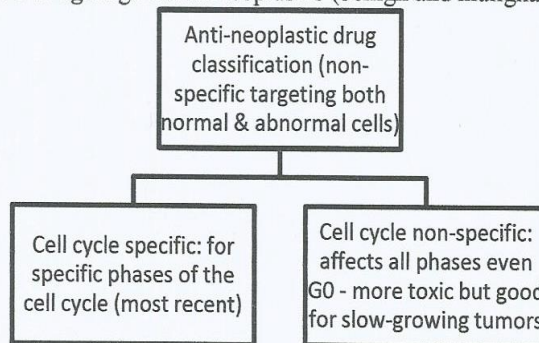
**In neoplasms:**



- **Cancer:** it is uncontrolled multiplication and spread within the body of abnormal cells.

**Terminologies:**

- **Anti-neoplastic drugs:** against all neoplasms (benign and malignant).



- **Anti-cancer drugs:** against all malignant neoplasms (cancers).
- **Cytotoxic drugs:** sub-class of anti-neoplastic drugs. These are the core drugs in cancer chemotherapy.
- **Notice that in cancer chemotherapy, we use combined drugs.**
- **Log-cell-kill hypothesis:**
  - A given antineoplastic drugs kills constant fraction of cells. Example: if a tumor has 1000 cells → it will kill 50% (500 cells) and if a tumor has 10000 cells → it will also kill 50% (5000) cells.
  - Inverse relation between initial tumor cell number and remission of curability (↑ number = ↓ cure).

- We give drugs in cycles to avoid toxicity and give the patient time to recover.  
Toxicity includes:

- ✓ Bone marrow failure which is represented by:

- ❖ ↓ RBCs: anemia.
- ❖ ↓ WBCs: Immunosuppression.
- ❖ ↓ platelets: bleeding

- General approaches to cancer management:

- **Surgical excision:** for solid, localized and early stages (when there is no metastasis).
- **Radiation:** disadvantages include:
  - ✓ Release of ROS (Reactive oxygen species).
  - ✓ How to keep it specific.
- **Chemotherapy:** curative v. palliative (not to cure but to decrease pain).
- **Multimodality:** two or more ways used together.
- **Management of treatment-related complication** (e.g. nausea, vomiting, bone marrow failure... etc).