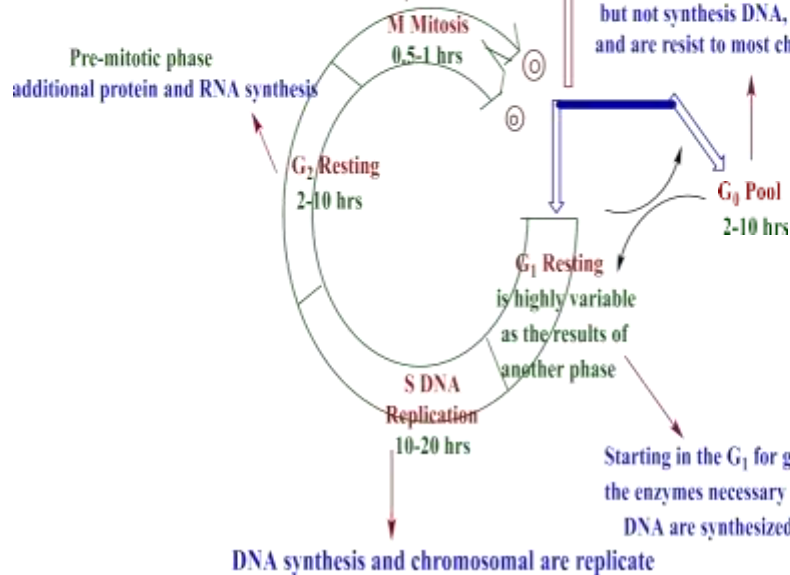


Cell cycle (Cell division cycle):-

these two cells can either go back into cycle,
or mature and then die, or go into resting G_0 phase

Finally, the cell enters mitosis (M-Phase)
which involve the formation of spindle
apparatus and chromosomal separation
and two new cells are formed

Pre-mitotic phase
additional protein and RNA synthesis



(senescence, quiescent phase)
in this phase cells are using energy,
but not synthesis DNA, nor replication
and are resist to most chemotherapeutic agents

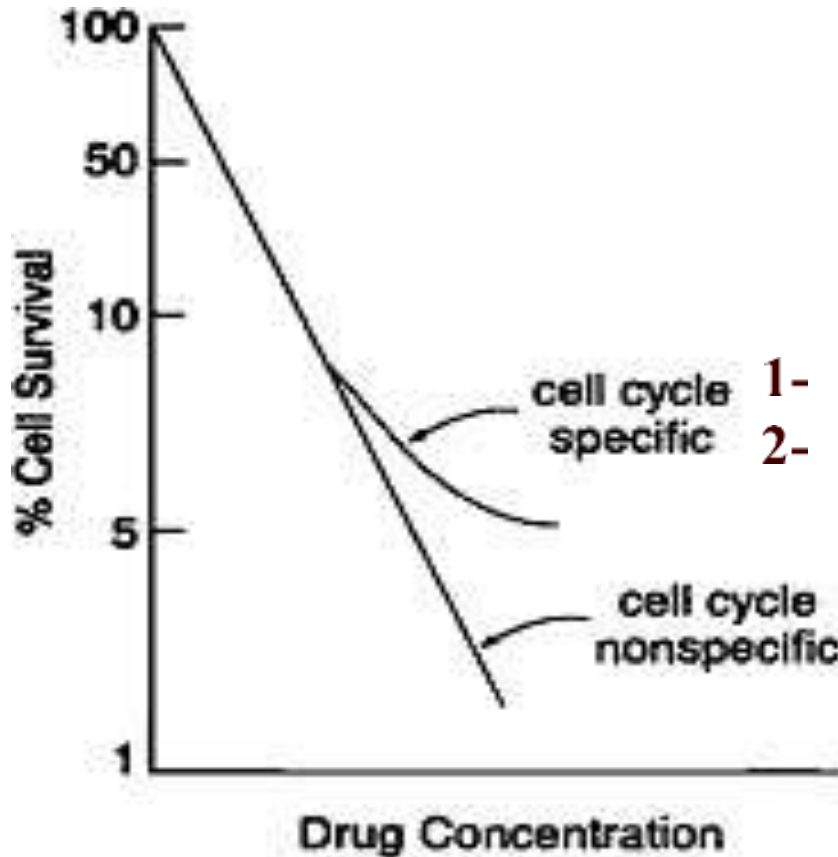
In G_0 phase cells leave the cell cycle but can re-enter and proliferate some times in the future

type of cell and autoregularity factors determine the time spend in G_0 phase

Starting in the G_1 for gap 1 or growth 1 phase,
the enzymes necessary for the replication of
DNA are synthesized

DNA synthesis and chromosomal are replicate

The Classification of Anticancer Drugs



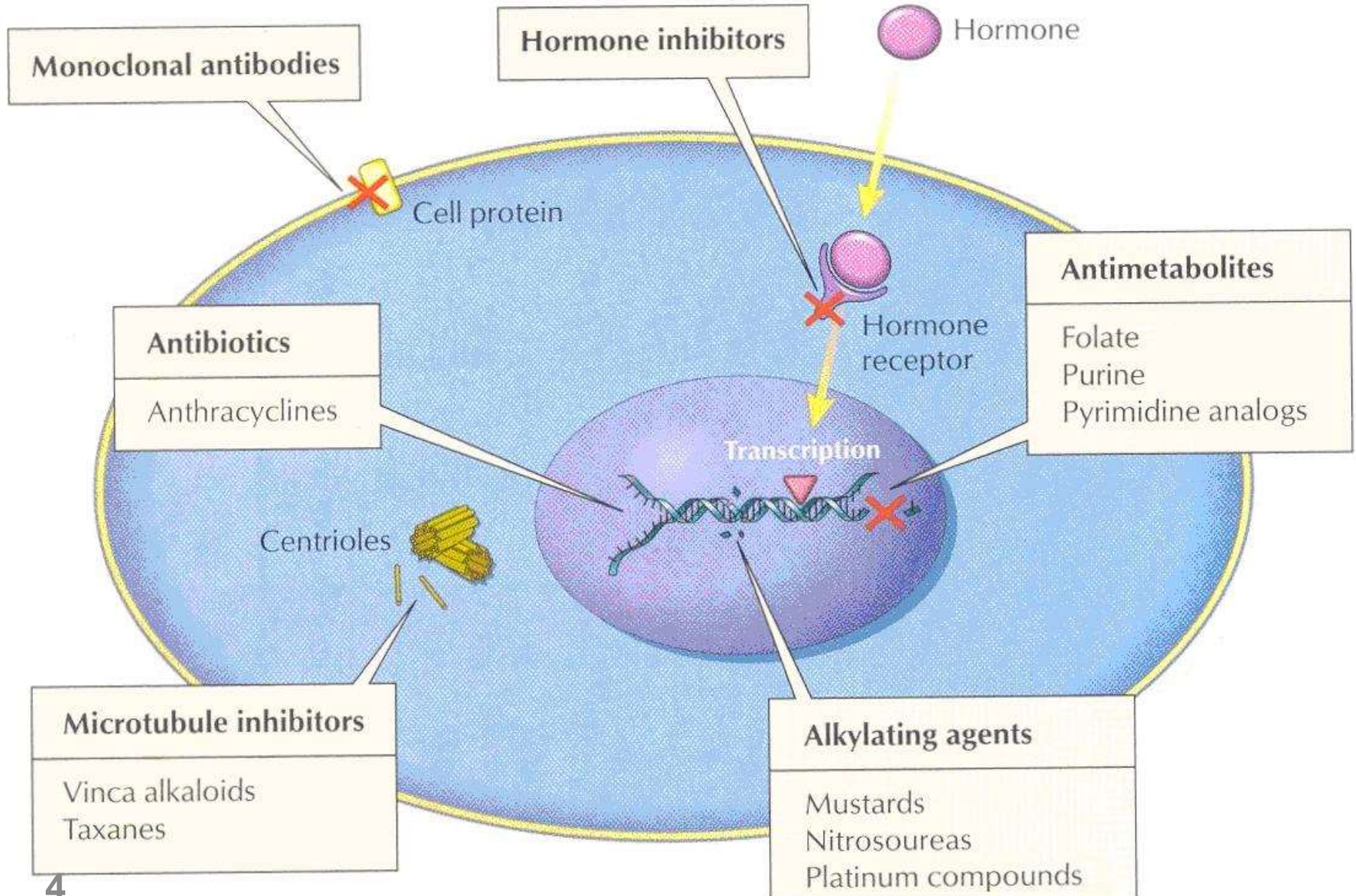
- 1- Antimetabolite.
- 2- Mitotic inhibitors

- 1- Alkylating Agents.
- 2- Platinum Compounds.
- 3- Antibiotics.

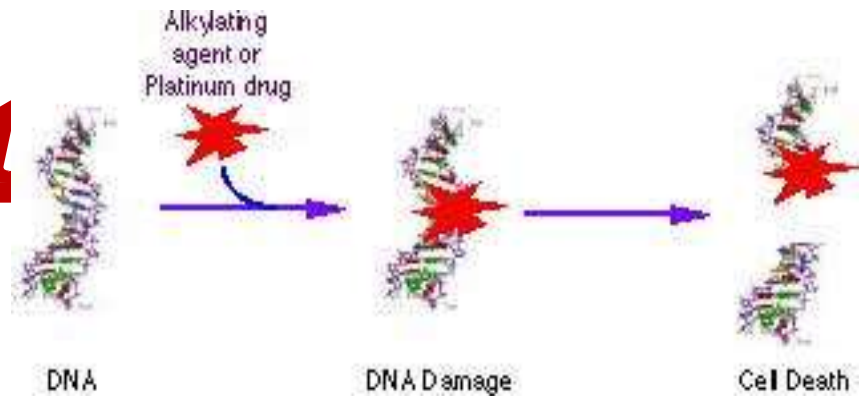
Antineoplastic agents

- 1 Alkylating agents.**
- 2 Antimetabolites.**
- 3 Antibiotics.**
- 4 Plant products.**
- 5 Miscellaneous**
- 6 Hormones.**
- 7 Gene Therapy.**
- 8 Monoclonal Antibodies.**

Anticancer Drugs



Alkylating Agent



Nitrogen Mustards

- Mechlorethamine
- .Chlorambucil
- .Melphalan
- Cyclophosphamide
- Ifosfamide
- .Thiotepa

Nitrosoureas

- Carmustine
- Lomustine

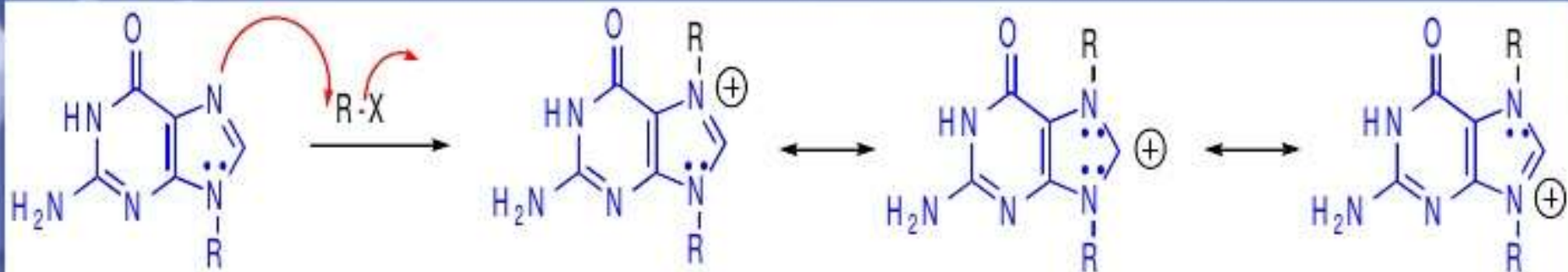
Alkyl sulfonate

- Busulfan

Platinum complexes

- Cisplatin
- Carboplatin

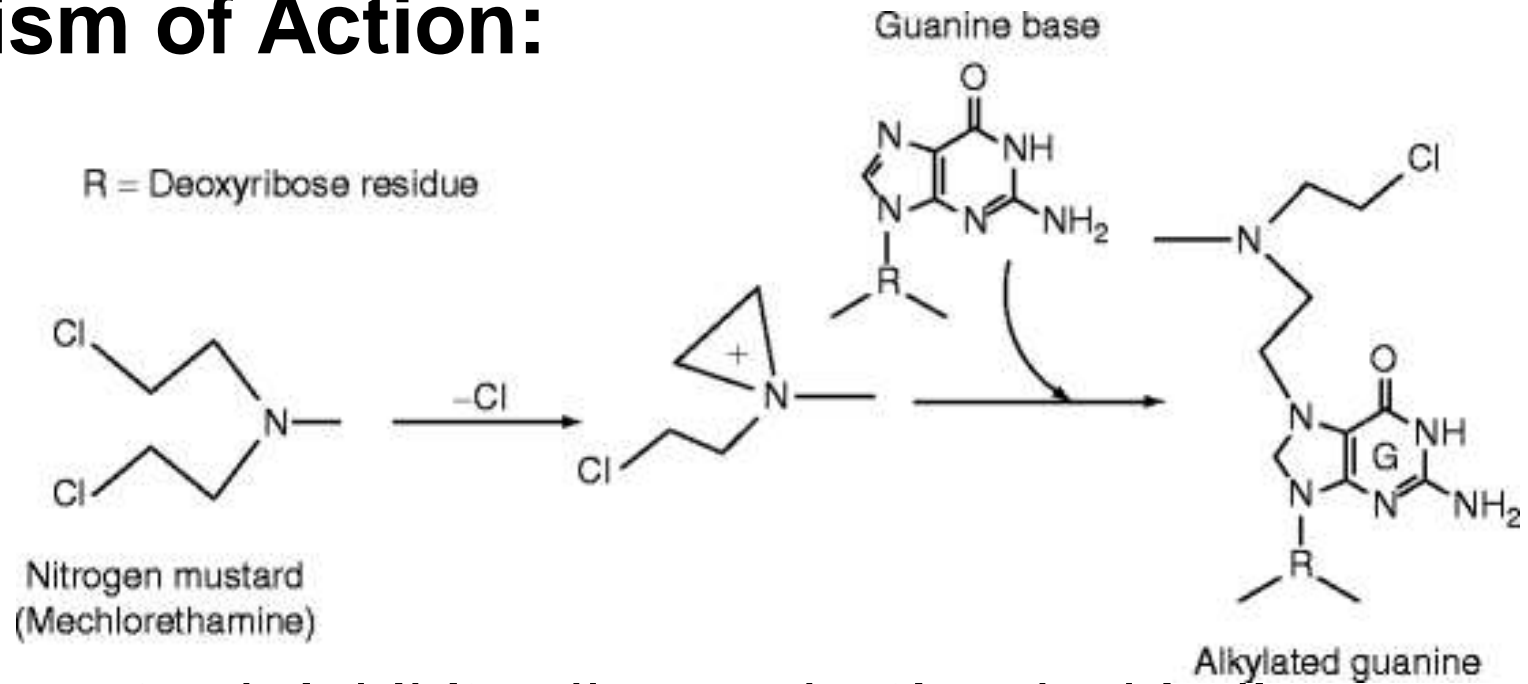
ALKYLATING AGENTS



Produce Highly reactive carbonium Ion which transfer alkyl group to position 7 of guanine by the covalent bond.

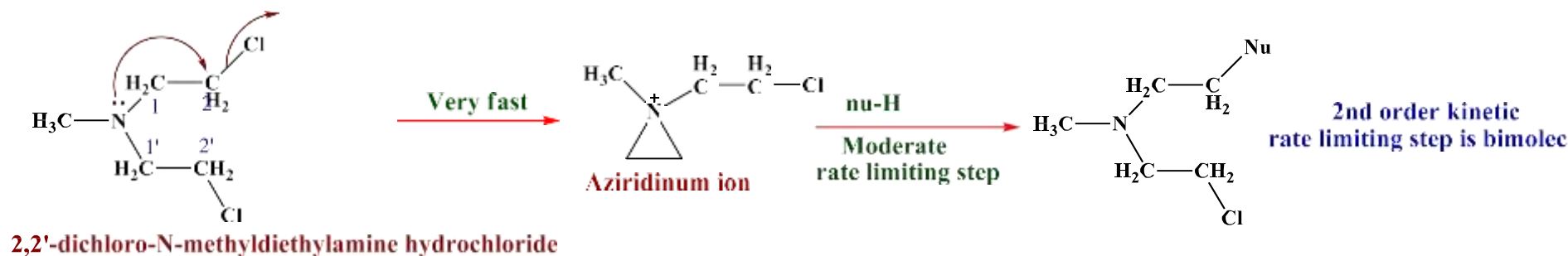
Alkylating Agents

Mechanism of Action:

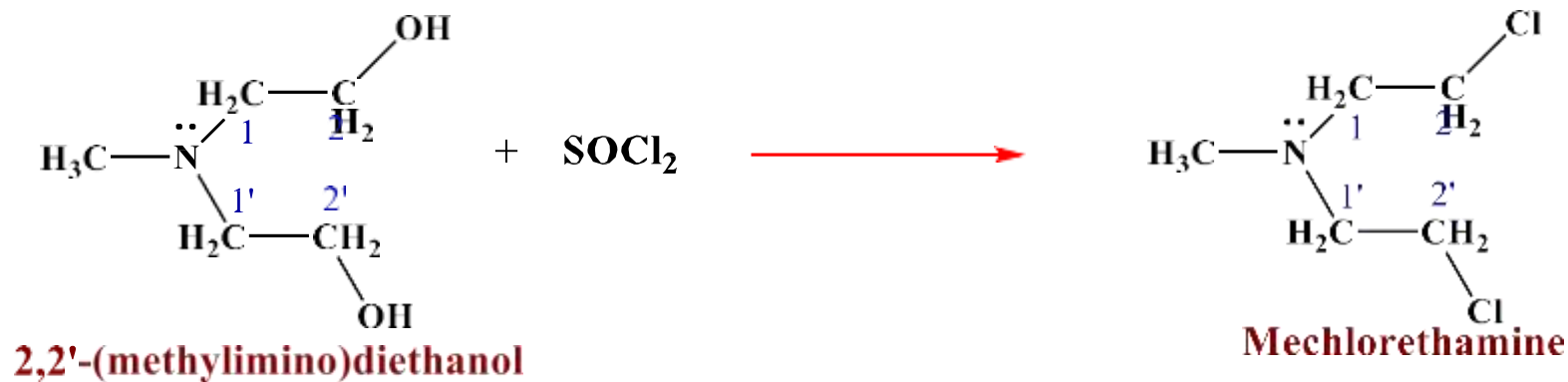


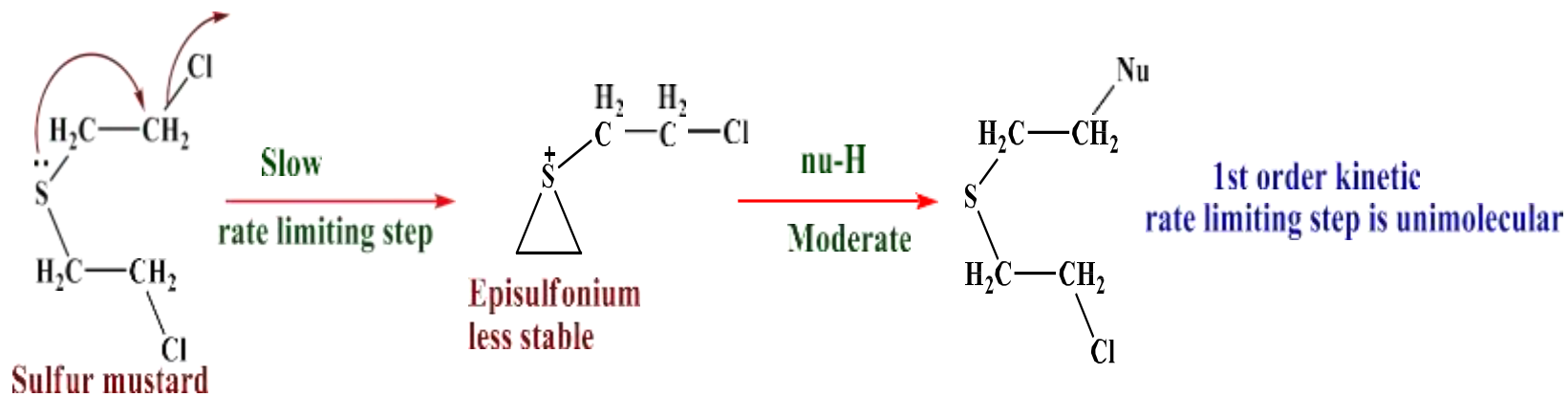
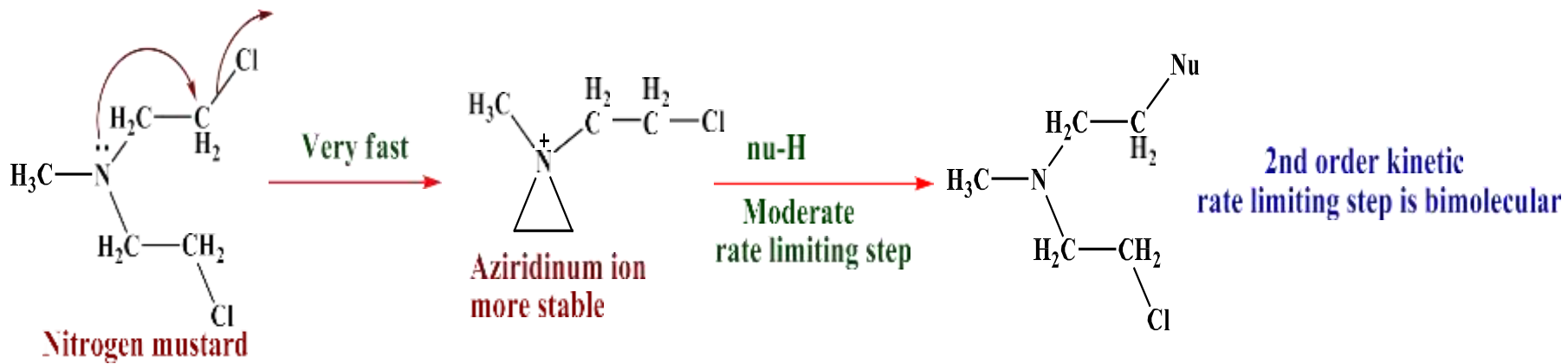
- Nitrogen mustards inhibit cell reproduction by binding irreversibly with the nucleic acids (DNA)
- After **alkylation**, DNA is unable to replicate and therefore can no longer synthesize proteins and other essential cell metabolites
 - Consequently, cell reproduction is inhibited and the cell eventually dies from the inability to maintain its metabolic functions.

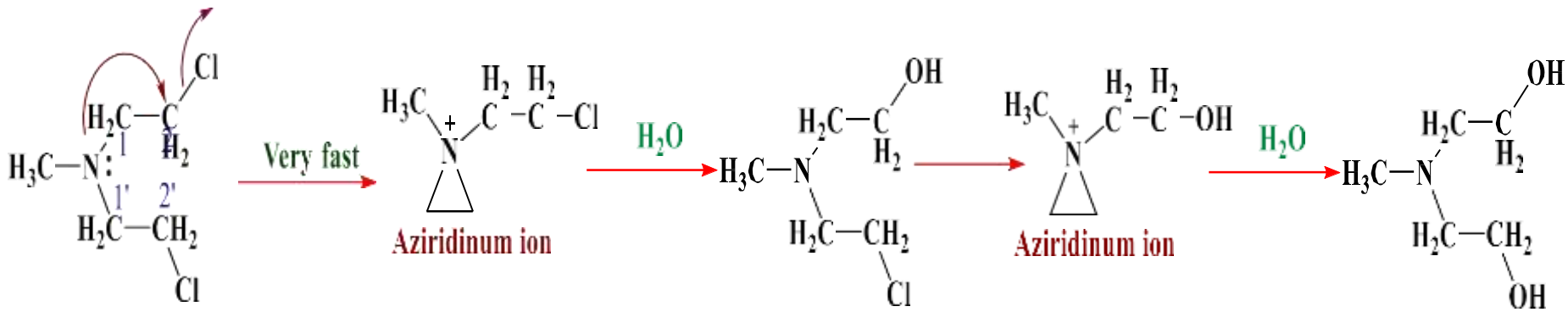
A- Mechlorethamine hydrochloride



Preparation of mechlorethamine







Mechlorethamine is usually used in combination with other antineoplastic agents: M(mechlorethamine), O(oncovin), P(procarbazine), and P(prednisone) and this combination is known as MOPP regimen.

Uses:- Hodgkin's disease, lymphosarcoma, chronic myelocytic or lymphocytic leukemia, bronchogenic carcinoma, metastatic carcinoma.

Dosage form: - powder for inj(10mg).

S/E bone marrow depression, nausea and anorexia.

Nitrogen Mustards

Mechlorethamine: (MUSTARGEN)

Unstable, given IV immediately after being made up

Part of MOPP (Mechlorethamine – oncovine-prednisolone and procarbazine) in Hodgekin`s lymphoma .

Toxicity:

- Severe Vomiting
- bone marrow toxicity
(myelo and immunosuppression)
- tissue damage with **extravasation**

