

Learning unit: Cytostatics and targeted anticancer drugs

Impact of the learning unit

Learning unit summarizes drugs used for treatment of cancer and other pharmacological interventions in oncological patients including substances used to decrease toxicity of anticancer drugs.

Important terms

anticancer drugs

cytostatic agents

adverse effects of cytostatics and their pharmacological management

myelosuppression (bone marrow toxicity)

haemopoietic growth factors

nausea and vomiting

– see the learning unit 26.1. Antiemetics

mucosal toxicity (mucositis, stomatitis, gastrointestinal ulceration, ...)

cardiotoxicity

nephrotoxicity and urotoxicity

mesna

hydration and urinary alkalinisation

diuretics

neurotoxicity

other side effects

classification of cytostatic agents according to their mechanisms of action

drugs with direct effects on the nucleic acid structure

alkylating agents

cyclophosphamide

melphalan

busulfan

temozolomide

nitrosourea derivatives

lomustine

platinum compounds

cisplatin

oxaliplatin

carboplatin

intercalating agents

anthracyclines

doxorubicin

epirubicin

bleomycin

drugs influencing nucleic acid synthesis

antimetabolites

methotrexate

6-mercaptopurine

5-fluorouracil

- hydroxyurea (hydroxycarbamide)
- topoisomerase inhibitors
 - topoisomerase I inhibitors
 - irinotecan**
 - topoisomerase II inhibitors
 - etoposide**
- drugs influencing microtubule assembly and function
 - vinca alkaloids
 - vinblastine**
 - vinorelbine**
 - taxanes
 - paclitaxel**
 - docetaxel**
- other cytostatic agents
 - asparaginase

hormonal anticancer therapy – see 13.1 Sex hormones and 11.1. Immunopharmacology

- antioestrogens
- antiandrogens
- GnRH antagonists
- glucocorticoids

targeted anticancer drugs

- monoclonal antibodies
 - rituximab
 - trastuzumab
 - bevacizumab
- T-cells activity modulators
 - anti-PD-1
 - nivolumab
 - anti-CTLA-4
 - ipilimumab
- enzymatic reactions inhibitors
 - bortezomib (proteasome function inhibitor)
- tyrosine kinase inhibitors
 - imatinib
 - sunitinib

complementary anticancer therapy (other pharmacological interventions)

- drugs used for the management of cancer pain
 - opioid analgesics – see the learning unit 14.1 Opioid analgesics
- psychotropic drugs in the therapy of cancer pain
 - tricyclic antidepressants – see the learning unit 18.1 Antidepressants
 - anticonvulsants – see the learning unit 17.1 Anticonvulsants
- bisphosphonates – see 31.2. Drugs used for therapy of osteoporosis and thyroid diseases
 - zoledronate
- denosumab

drugs used to decrease toxicity of anticancer drugs

- mesna
- leucovorin (calcium folinate)

specificity of cytostatics related to the cell cycle phases
pharmacotherapy of cancer diseases
 adjuvant, neoadjuvant pharmacotherapy
 curative / supportive therapy and palliative care
 induction / consolidation therapy

Learning outcomes

Student defines the cytostatic and chemotherapeutic agents.

Student knows basic pharmacological profile (mechanism of action, adverse effects, indications, contraindications) of the particular groups of anticancer drugs and other drugs used in oncology (e.g., drugs used to mitigate some side effects of cytostatic drugs).

Student gives examples of drugs decreasing toxicity of cytostatics and explain their mechanisms of action.

Recommended study materials

Rang & Dale's Pharmacology E - Book, Humphrey Rang 8th edition, 2016, chapter 56 (pp. 676 – 690)
 additional texts (chapter 36 (pp. 439-448); chapter 26 (pp. 327-330))

Recommended study materials for Pharmacology subject.