Recent developments in anti-cancer drug research

Special Thematic Issue for Current Medicinal Chemistry

Recent developments in anti-cancer drug research
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Aims & Scope:
Cancer is the second cause of death worldwide, just after cardiovascular diseases. According to the World Health Organization, 8.8 million people died from cancer in 2015. The development of novel drugs for cancer treatment is a priority and indeed this is a very active area of research. Since cancer can affect almost any part of the body, specific treatment strategies are also needed. In this issue we aim to review the recent literature on novel targets for drug development, the synthesis of small molecules with lead potential and new developments in photodynamic therapy.

More specifically in this issue of Current Medicinal Chemistry we review recent developments on approaches targeting the tumor microenvironment, such as aerobic glycolysis, which is characteristically accelerated in cancer cells or the p53 protein, which as a result of mutations has lost its normal capacity to trigger cell apoptosis and to suppress tumor progression. The use of transporter-conscious drugs, which can be delivered across cell membranes by transporters that are overexpressed in cancer cells, thus overcoming any acquired anti-cancer drug resistance, is also reviewed and at a more macroscopic level, the use of ionic liquids to facilitate the transdermal delivery of drugs in topical applications.

The synthesis of novel photosensitizers for photodynamic therapy, a cancer treatment recognized as being minimally invasive and minimally toxic, is reviewed. In addition, the recent literature related to the development of novel small-molecule medicines is covered for some important classes of compounds: indoles, a ring system found in a few medicines currently approved for the treatment of cancer; goniothalamin-related styryl lactones, substances that show potent anti-cancer activity against kidney, breast and lung cancer cells, amongst others, by targeting DNA; oxazoles, important building blocks for anti-cancer agents, some of which are potent anti-mitotic agents on their own; and flavonoid glycosides, many of which are widely distributed in plants and also occur as fungal metabolites, and have recognized anti-cancer properties.

Finally, metal complexes of interest for their anticancer properties are reviewed: metal complexes with scorpionate ligands, which are cytotoxic against cancer cells and metal complexes, which are administered as an inactive or pro-drug form that allows the transport of drugs to the tumoral regions where they released upon metal activation either by hypoxia, characteristic of cancer cells, or by the action of some form of radiation.

Keywords: Cancer, tumor microenvironment, photodynamic therapy, metal complexes, scorpionate ligands, hypoxia.

Subtopics:
The subtopics to be covered within this issue are listed below:

1. novel targets for cancer therapy,
2. small molecule development for chemotherapy,
3. photodynamic therapy.

Schedule:

- Manuscript submission deadline: April 2018
- Final manuscripts due: October 2018

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