

modifiers to enhance biodistribution and tumor targeting. Among several types of nanoparticles directed to enhance the properties of magnetic resonance imaging (MRI) contrast agents,⁶⁹ dendrimers, which are self-assembling polymers, have been used in mouse models of breast cancer to study the lymphatic drainage by MRI.⁷⁰

Beyond nanovectors, several nanotechnologies are realistic candidates for the precise patterning of biological molecules, including DNA microarrays and surface-enhanced laser desorption/ionization time-of-flight (SELDI-TOF) mass spectroscopy.⁷¹

Microarrays are devices used for molecular diagnostics, genotyping, and biomarking. They are single-stranded DNA probes that are prepared through a sequential procedure that implies selective ultraviolet deprotection of hydroxyl groups. With the ability to control the molecular depositions of polynucleotides in a nanometer range, the information density might be packed in nanoarrays directed at nucleic acids⁷² or at the detection of proteomic profiles.⁷³

9 SUMMARY OF FDA-APPROVED ANTICANCER DRUGS

Tables 1.1–1.9 summarize the main drugs approved by the FDA for use as anticancer agents according to the chapter in which they first appear.⁷⁴ The preponderance in recent years of targeted approaches to cancer treatment over cytotoxicity-based chemotherapy is readily appreciated. Orphan drug designations, drug combinations, and adjuvants in cancer therapy have been excluded.

Table 1.1 FDA-Approved Anticancer Drugs Described in Chapter 2

Drug	Mechanism of Action	Approval Date (First Indication)
6-Mercaptopurine (Purinethol [®])	Purine biosynthesis inhibitor	1953
Methotrexate	Dihydrofolate reductase inhibition	1962
5-Fluorouracil (5-FU)	Thymidylate synthase inhibitor	1966
Tegafur (Ftorafur [®])	Thymidylate synthase inhibitor	1967
Hydroxyurea (Hydrea [®])	Ribonucleotide reductase inhibitor	1967
Cytarabine (Ara-C, Cytosar U [®])	DNA synthesis inhibitor	1969
Floxuridine (FUDR)	Thymidylate synthase inhibitor	1970
L-Asparaginase (Elspar [®])	Hydrolysis of circulating L-asparagine	1978
Pentostatin (Nipent [®])	Adenosine deaminase inhibitor	1991
Fludarabine (Fludara [®])	DNA synthesis inhibitor	1991
Cladribine (Litak [®])	DNA synthesis inhibitor	1992
Trimetrexate (Neutrexin [®])	DHFR inhibitor	1994
Gemcitabine (Gemzar [®])	DNA synthesis inhibitor	1996
Capecitabine (Xeloda [®])	DNA synthesis inhibitor	1998
Raltitrexed (Tomudex [®])	Thymidilate synthase inhibitor	1998
Azacitidine (Vidaza [®])	DNA synthesis inhibitor	2004
Clofarabine (Clolar [®])	DNA synthesis inhibitor	2004
Pemetrexed (Alimta [®])	Thymidilate synthase and dihydrofolate reductase inhibitor	2004

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