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Concise Manual
of Hematology and Oncology
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How Do We Treat?

Hematology and Oncology have seen rapid progress and advances during recent years. Increased knowledge of tumor biology, epidemiology, molecular genetics, growth regulation, and cellular functions has led to novel therapeutic paradigms. Targeted treatment approaches, antibodies, immunotherapy, and other new techniques complement classic chemotherapy, radiotherapy, and surgery. Patients are increasingly well educated as web-based information on diagnostic and therapeutic options as well as quality management and tumor outcome data are readily available.

In this dynamic and fast-paced environment, it is of central importance to base clinical decisions and medical practice on the best available evidence. Continuous quality management, with clinical process documentation, standardization, and evaluation, leads to improved patient care and long-term outcomes. For these reasons, we have started to systematically capture and evaluate data on diagnosis, treatment, and outcomes of patients with solid tumors and hematological neoplasms at the Freiburg University Medical Center. We have developed standard operating procedures, clinical pathways, and diagnostic and therapeutic processes, following the principles of “Good Clinical Practice.” These processes (e.g., detailed protocols for chemotherapy application, treatment flowcharts, clinical pathways) are continuously tested and validated in clinical practice. National and international guidelines, new clinical study data, and international expert advice are incorporated into a framework of clinical standards. Based on this work, the Freiburg University Medical Center and the Comprehensive Cancer Center Freiburg have been recognized as one of the centers of excellence in hematology and oncology in Germany and Europe.

The Concise Manual of Hematology and Oncology is the result of this continuous process. It offers a specific view based on the daily practice at a large European academic medical center, and we welcome any comments and discussion. Several German language editions of the manual have been published since 1998, and we are thankful for all the positive feedback and constructive criticism we received. With the first English edition, we again want to support practicing physicians and healthcare providers in their daily interaction with patients in hematology and oncology. Treatment of patients with malignant diseases is always a challenge, in curative, supportive, and palliative settings, and each patient—in his or her unique situation—deserves the best available therapy and care.

The Editors
March 2008
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Abbreviations

A. Arteria
Aa. Arteriae
Ab. Antibody
abs. absolute (ly)
Ad Adresses
Ag Antigen
AIDS Aquired Immune Deficiency Syndrome
AIHA Autoimmune Hemolytic Anemia
AJCC American Joint Committee on Cancer
ALL Acute lymphoblastic Leukemia
AML Acute myeloid Leukemia
ANA Antinuclear Antibodies
a.o. among others
ARDS Acute Respiratory Distress Syndrome
ATIII Antithrombin III
ATTN Attention, be careful,
B Bolus injection
BC Blood Count
BCh Biochemistry
BM Bone marrow
BW Body weight
BSA Body surface area
°C Degree Celsius
Ca²⁺ Calcium
CD Cluster of Differentiation
CFU Colony Forming Units
Chap. Chapter
Chem Chemistry
Ci. Contraindication
c.i.v. continuous intravenous
CI Chloride
Class Classifikation
CLL Chronic lymphatic Leukemia
CML Chronische myeloid Leukemia
CMV Cytomegalie Virus
CNS Central nervous system
Co Complications
CRP C-reactive Protein
CSF CerebroSpinal Fluid
CT Computed tomography
CVC Central Venous Catheter
CVL Central Venous Line
CVP Central Venous Pressure
d day(s) (dies)
DLCBL Diffuse Large B-Cell Lymphoma
Dd Differential diagnosis
Ddi Drug drug interaction

DDAVP Desamino-D-Arginin-Vasopressin (Desmopressin)
Def Definition
DFS Disease free survival
DFI Disease free interval
Dg Diagnostic
DIC Disseminated intravascular Coagulation
dl Deciliter (100 ml)
DNA Deoxyribonucleic Acid
Dos Dosing
EBV Epstein Barr Virus
ECOG Eastern Cooperative Oncology Group (ECOG Performance Scale)
ECG Elektrocardiogram
E.g. for instance
EORTC European Organisation for Research and Treatment of Cancer
Ep Epidemiology
ES Extrasystoles
ESR Erythrocyte Sedimentation Rate
Et Etiology
e.tc. et cetera
F Factor (Clotting factors F1 to FXIII)
FBC Full Blood Count
FIGO International Federation of Gynecology and Obstetrics
F/U Follow Up
g Gram
GFR Glomerular Filtration Rate
GvHD Graft versus Host Disease
GvL Graft versus Leukemia
h hour(s) (hora)
HAV Hepatitis A Virus
Hb Hemoglobin
HBV Hepatitis B Virus
HCV Hepatitis C Virus
hd high dose
HIT Heparin-induced Thrombopenia
HIV Human Immunodeficiency Virus
Hkt Hematocrit
HSV Herpes Simplex Virus
HUS Hemolytic-uremic Syndrome
i.a. Intraarterial
i.m. Intramuscular
i.p. intraperitoneal
i.th. Intrathecal
i.v. Intravenous
<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>ICD-10</td>
<td>International Classification of Diseases (10. edition)</td>
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<tr>
<td>Ig</td>
<td>Immunglobulin(e)</td>
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<td>Ind</td>
<td>Indication</td>
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<td>ITP</td>
<td>Idiopathic thrombocytopenic Purpura</td>
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<td>IU</td>
<td>International Units</td>
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<tr>
<td>K+</td>
<td>Potassium</td>
</tr>
<tr>
<td>kDa</td>
<td>kilo Dalton</td>
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<tr>
<td>kg</td>
<td>Kilogramm</td>
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<tr>
<td>l</td>
<td>Liter</td>
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<tr>
<td>LDH</td>
<td>Lactate dehydrogenase</td>
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<td>LFT</td>
<td>Liver Function Tests</td>
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<td>Lit</td>
<td>Literature</td>
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<td>LMWH</td>
<td>Low Molecular Weight Heparin</td>
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<tr>
<td>Ln</td>
<td>Lymph nodes</td>
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<td>LPHD</td>
<td>Lymphocyte Predominant Hodgkin's Disease</td>
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<td>M.</td>
<td>Morbus</td>
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<td>MALT</td>
<td>mucosa associated lymphoid tissue</td>
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<td>MDS</td>
<td>Myelodysplastic Syndrome(s)</td>
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<td>Meth</td>
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<tr>
<td>mg</td>
<td>Milligram</td>
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<tr>
<td>µg</td>
<td>Microgram</td>
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<tr>
<td>Mg2+</td>
<td>Magnesium</td>
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<tr>
<td>MGUS</td>
<td>Monoclonal Gammapathy of Unknown Significance</td>
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<tr>
<td>min</td>
<td>Minute(s)</td>
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<td>ml</td>
<td>Milliliter</td>
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<tr>
<td>µl</td>
<td>Microliter</td>
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<tr>
<td>MOA</td>
<td>Mechanism of Action</td>
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<td>MPS</td>
<td>Myeloproliferative Syndrome(s)</td>
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<tr>
<td>MW</td>
<td>Molecular weight</td>
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<tr>
<td>Na+</td>
<td>Sodium</td>
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<td>NCI</td>
<td>National Cancer Institute</td>
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<td>NHL</td>
<td>Non-Hodgkin's Lymphoma</td>
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<td>NMR</td>
<td>Nuclear Magnetic Resonance Tomography</td>
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<td>Path</td>
<td>Pathology</td>
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<td>PBCh</td>
<td>Pathobiochemistry</td>
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<td>PBSCT</td>
<td>Peripheral Blood Stem Cell Transplantation</td>
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<td>PCP</td>
<td>Pneumocystis Carinii Pneumonia</td>
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<td>PCR</td>
<td>Polymerase Chain Reaction</td>
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<td>Prophylaxis</td>
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<td>registered trade mark</td>
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<td>RFA</td>
<td>Radio frequency ablation</td>
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<td>RNA</td>
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<td>Radiotherapy</td>
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<td>Systemic Lupus erythematodes</td>
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<td>SOP</td>
<td>Standard Operating Procedure</td>
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<td>Supraventricular Extrastyles</td>
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<tr>
<td>t½</td>
<td>Half life time</td>
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<td>Total Body Irradiation</td>
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<td>Urine and Electrolytes</td>
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<td>UICC</td>
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Special symbols

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<td>Mu, Micro</td>
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<td>≥</td>
<td>larger or equal</td>
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<td>≤</td>
<td>smaller or equal</td>
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<td>about</td>
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<td>men, male</td>
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<td>►</td>
<td>see (refers to other chapter)</td>
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<td>♀♂</td>
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Additional Abbreviations are explained in the respective chapters.
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<table>
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1.1 Epidemiology

D.P. Berger, H. Henß

Def: Describes the frequency with which a disease occurs and examines possible links between disease occurrence and risk factors.

Meth: Terms
- **Incidence**: total number of new cases of a given disease occurring in a population during a defined time interval (e.g., new cases per year)
- **Incidence Rate**: incidence within a given population (e.g., incidence per 100,000 people)
- **Prevalence**: total number of affected members of the population at a set point in time
- **Prevalence Rate**: prevalence within a given population (e.g., prevalence per 100,000 people)
- **Mortality**: total number of disease-related deaths occurring during a defined time interval (e.g., disease-related deaths per year)
- **Mortality Rate**: mortality within a given population (e.g., disease-related deaths per 100,000 people per year)

Risk
Describes the likelihood of an event occurring within a defined time interval, e.g., risk of developing a particular tumor (incidence risk) or risk of dying of a disease (mortality risk).

Risk Factors
Factors contributing to a specific risk. Risk factors for malignant diseases include demographical data (age, sex), geographical distribution, socio-economic factors, environmental factors, and biological parameters ("molecular epidemiology").

Relative Risk (RR)
Epidemiological term which compares the risk (e.g., of disease occurrence) within a specific sub-population ("high-risk group," e.g., smokers) with the average population. A factor > 1.0 represents an increased RR, factors < 1.0 constitute a reduced RR.

Average Age at Which a Disease Occurs
Maximum of the age-specific distribution of cases of a disease.

Incidence, age distribution, and gender distribution of each entity are shown in the disease-related chapters (Chaps. 6.1–8.13). Recent research suggests that 70–80% of all malignant diseases are triggered by certain lifestyle habits or environmental carcinogens. In addition, hereditary factors are of particular importance (Chap. 1.2).
Development of mortality rates of female patients with solid tumors (USA, 1930–2003, age-adjusted mortality rate per 100,000)

Source: American Cancer Society, Cancer Facts and Figures 2003

Development of mortality rates of male patients with solid tumors (USA, 1930–2003, age-adjusted mortality rate per 100,000)

Ref:

Web:
1. http://www.cancer.org/ American Cancer Society
1.2 Carcinogenesis, Molecular Tumor Biology

D.P. Berger, U. Martens

Def: Development of malignant diseases is a result of multiple exogenic and endogenic factors. Of pivotal importance is the accumulation of genetic and epigenetic changes leading to the selection of a cell population with malignant phenotype. Characteristics are:

- Unlimited proliferation, immortalization
- Loss of antiproliferative feedback mechanisms, autonomous growth, not dependent on proliferation signals (e.g., autocrine stimulation)
- Loss of ability to induce apoptosis
- Neovascularization
- Metastatic and invasive properties

Pg: The development of a malignant tumor requires several steps (see model of multistep carcinogenesis). Point mutations (single nucleotide changes) or cytogenetic aberrations (e.g., translocation / inversion / deletion) lead to altered activity of genes (e.g., p53, pRB) impacting tumor growth regulation and biology of malignant cells. These can be hereditary (“germline mutation”) or spontaneous (“somatic mutation”) as a result of multiple factors (“carcinogens” or carcinogenic defects).

**Exogenous Carcinogens:**
- Chemicals, drugs
- Ionizing radiation
- Infections (viruses, bacteria, protozoa, particularly chronic infections)

**Endogenous Carcinogens:**
- Defective DNA repair mechanisms
- Defective regulation of epigenetic events
- Genetic instability

Model of multistep carcinogenesis

![Model of multistep carcinogenesis](image)
## Carcinogens and associated human neoplasias

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<th>Associated diseases</th>
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Carcinogens and associated human neoplasias (continued)

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<td>Schistosomiasis</td>
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Ref:

Web:
8. http://www.nature.com/nrc/poster/subpathways/index.html | A subway map to cancer
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<td>Colorectal cancer</td>
<td>Gastric cancer, pancreatic carcinoma, osteomas, medulloblastoma</td>
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<td>Hypernephroid carcinoma</td>
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</tr>
<tr>
<td>Hereditary papillary renal carcinoma</td>
<td>MeT</td>
<td>7q31</td>
<td>Papillary renal carcinoma</td>
<td>Other solid tumors</td>
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<td>Familial melanoma</td>
<td>CDKN2A(p16), CDK4</td>
<td>9p21, 12q13</td>
<td>Melanoma</td>
<td>Pancreatic carcinoma, dysplastic moles</td>
</tr>
<tr>
<td>Multiple endocrine neoplasia 1 (MEN 1)</td>
<td>MEN 1</td>
<td>11q13</td>
<td>Islet carcinoma</td>
<td>Parathyroid adenomas</td>
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<tr>
<td>Multiple endocrine neoplasia 2 (MEN 2)</td>
<td>MEN 2 (RET)</td>
<td>10q11.2</td>
<td>Medullary thyroid carcinoma</td>
<td>Pheochromocytomas, hamartomas, parathyroid adenomas</td>
</tr>
<tr>
<td>Cowden’s syndrome</td>
<td>PTEN, MMAC1</td>
<td>10q23</td>
<td>Breast cancer, follicular thyroid carcinoma</td>
<td>Hamartomas, intestinal polyps, cutaneous lesions</td>
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<tr>
<td>Ataxia telangiectasia (Louis-Bar)</td>
<td>ATM</td>
<td>11q22</td>
<td>Lymphomas</td>
<td>Ataxia, immunodeficiency, breast cancer</td>
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<tr>
<td>Xeroderma pigmentosum</td>
<td>XBD, XPD, XPA</td>
<td>Variable</td>
<td>Skin tumors</td>
<td>Abnormal pigmentation, hypogonadism</td>
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<tr>
<td>Fanconi’s anemia</td>
<td>FACC, FACA</td>
<td>9q22, 16q24</td>
<td>AML</td>
<td>Pancytopenia, skeletal defects</td>
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<td>Retinoblastoma</td>
<td>RB</td>
<td>13q14</td>
<td>Retinoblastoma</td>
<td>Osteosarcomas</td>
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<td>Tuberous sclerosis</td>
<td>TSC1, TSC2</td>
<td>9q34, 16p13</td>
<td>Cutaneous fibroadenomas</td>
<td>Astrocytomas, skin tumors</td>
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</table>
1.3 **Hematopoiesis and Development of Hematological Neoplasia**

C.I. Müller, D.P. Berger, M. Engelhardt

**Def:** Hematopoiesis is the formation of effector cells of the peripheral blood and bone marrow. In the bone marrow, approximately $1 \times 10^{12}$ cells are formed daily.

**Differentiation:**
- **Myelopoiesis:** formation of myeloid effector cells (granulocytes, monocytes, macrophages)
- **Lymphopoiesis:** formation of lymphocytic effector cells (T lymphocytes, B lymphocytes)
- **Erythropoiesis:** formation of erythrocytes
- **Thrombopoiesis:** formation of thrombocytes (platelets)
- **Granulopoiesis:** formation of granulocytes (eosinophils, basophils, neutrophils)

**Phys:**

**Location of Hematopoiesis**
- Embryogenesis: hematopoiesis in liver → spleen → bone marrow
- Adulthood: bone marrow. In case of medullary insufficiency, liver and spleen can take over hematopoietic function (“extramedullary hematopoiesis”)

**Regulation of Hematopoiesis**
Proliferation and differentiation of stem cells, progenitor cells and effector cells are regulated by hematopoietic growth factors (HGF):
- Stem and progenitor cells: Flt-2 / flk-3 ligand, stem cell factor (SCF)
- Erythropoiesis: erythropoietin, SCF, interleukin-3 (IL-3)
- Thrombopoiesis: thrombopoietin, SCF, IL-3, IL-6, IL-11
- Granulopoiesis: IL-3, granulocyte colony-stimulating factor (G-CSF), GM-CSF
- Lymphopoiesis: Flt-2 / flk-3 ligand, SCF, IL-2, IL-6, IL-7

**Effector Cell Characteristics**
- **Erythrocytes:** carry oxygen and hemoglobin, diameter 8 µm, biconcave, akaryotic, development period 7 days, life span 120 days
- **Thrombocytes:** “platelets,” essential for coagulation, size 1–2 µm, granular, basophilic, development period 10–12 days, life span of circulating thrombocytes 7–8 days
- **Neutrophil granulocytes:** defense against infections (particularly bacterial infections), ≤ 5 nuclear segments connected by chromatin bridges (“segmented granulocyte”), development period 7–10 days, life span of mature neutrophil granulocyte 7–10 h, average production $10 \times 10^7$/h, in response to infection up to $500 \times 10^7$/h
- **Eosinophil granulocytes:** relevant in allergic and parasitic diseases, two nuclear segments connected by chromatin bridges, eosinophilic cytoplasm
- **Basophil granulocytes:** relevant in allergic and parasitic diseases, two nuclear segments connected by chromatin bridges, rough basophilic cytoplasmic granules
- **Monocytes:** resistance to infection and phagocytosis, nuclear sinuses and loosely structured chromatin, median life span in peripheral blood 20–40 days
- **B lymphocytes:** antibody-mediated immune response, plasmacytic precursors, diameter 7–12 µm, basophilic cytoplasm, central round nucleus with densely structured chromatin
- **T lymphocytes:** cellular immune response, diameter 7–12 µm, basophilic cytoplasm, central round nucleus with densely structured chromatin

**Phys:**

**Hematological Neoplasia**
Hematologic neoplasms are formed by malignant transformation of cells of certain developmental stages → some characteristics of the neoplastic disease may be aligned with features of the corresponding stage of differentiation, e.g., proliferative activity, surface markers (CD antigens), molecular markers.
BFU-E burst-forming unit–erythroid, CFU colony-forming unit, Ba basophils, E erythrocytes, Eo eosinophils, G granulocytes, M monocytes or macrophages, Meg megakaryocytes, NK natural killer
Example: B-cell development, differentiation, and expression of surface markers (CD antigens). Hematologic malignancies developing at a specific stage of differentiation will carry the given CD antigen expression pattern.

II. Interleukin, SCF Stem Cell Factor, CD Surface Marker (Cluster of Differentiation ➔ Chap. 2.5)

Formation of hematological neoplasias on the basis of:
- Erythropoiesis ➔ erythroleukemias (AML M6) ➔ Chap. 7.1.2
- Thrombopoiesis ➔ megakaryoblastic leukemias (AML M7) ➔ Chap. 7.1.2
- Granulopoiesis ➔ acute myeloid leukemias ➔ Chap. 7.1.2
- Lymphopoiesis ➔ lymphomas, lymphatic leukemias ➔ Chaps. 7.1.1, 7.4, 7.5

Ref:
5. Gilliland DG, Griffin JD. The roles of FLT3 in hematopoiesis and leukemia. Blood 2002;100:1532–42

Web:
1.4 Prevention and Screening

H. Henß

**Def:**
Primary prevention = prevention of tumor development  
Secondary prevention = tumor screening  
Tertiary prevention = post-treatment follow-up and care to ensure early detection of relapse

**Primary Prevention**

**Def:**
Successful primary prevention of all malignancies is currently unrealistic for the following reasons:
- Unresolved etiology and pathogenesis of malignant diseases
- Multiple oncogenetic mechanisms of malignant diseases
- Uncertain efficacy of the majority of primary preventive measures (chemoprevention, antioxidant therapy, etc.)

However, epidemiological research suggests that specific measures may reduce the risk of developing certain tumors. Activities with the potential for tumor prevention are:
- Sufficient physical exercise
- Adequate nutrition
- Avoidance of exogenous risk factors (e.g., smoking)

**Pg:**
Primary prevention focuses on definition, recognition, and avoidance of risk factors, which can be genetically determined and/or acquired. Once genetic risk factors have been identified, they can be used to define a high-risk population.

**Genetic Risk Factors: Examples (► Chap. 1.2)**
- Familial adenomatous polyposis (FAP) and other familial colorectal tumors (HNPCC)
- Familial breast cancer and/or familial ovarian carcinoma (BRCA1, BRCA2)
- Xeroderma pigmentosum

In the presence of genetic risk factors, cancer screening, preventive therapy, and chemoprevention have to be considered.

**Acquired Risk Factors Associated with Certain Tumors (► Chap. 1.2)**
- *Smoking:* lung cancer, squamous cell carcinoma of the head and neck, breast cancer, pancreatic carcinoma, bladder carcinoma, renal cell carcinoma
- *Alcohol:* squamous cell carcinoma of the head and neck, hepatocellular carcinoma, breast cancer, gastrointestinal tumors
- *Hazardous substances:* lung cancer (e.g., asbestos), nasopharyngeal carcinoma (hardwood dust), bladder carcinoma (tar, solvents)
- *Infections:* hepatocellular carcinoma (hepatitis B / C), cervical carcinoma (papilloma virus, HPV), gastric cancer (*Helicobacter pylori*)
- *Excess exposure to sunlight / UV light:* malignant melanoma, basal cell carcinoma
- *Obesity (esp. postmenopausal):* breast cancer, endometrial carcinoma, prostatic cancer, colorectal cancer

**Px:**
The “European Code Against Cancer” was developed as a source of information for patients. It contains general rules of conduct in order to prevent tumor development.
Many aspects of general health can be improved, and certain cancers avoided, if you adopt a healthier life style

1. Do not smoke. If you smoke, stop doing so. If you fail to stop, do not smoke in the presence of non-smokers
2. Avoid obesity
3. Undertake some brisk physical activity every day
4. Increase your daily intake and variety of vegetables and fruits: eat at least 5 servings daily. Limit your intake of foods containing fats from animal sources
5. If you drink alcohol, whether beer, wine, or spirits, moderate your consumption to two drinks per day if you are a man and one drink per day if you are a woman
6. Care must be taken to avoid excessive sun exposure. It is specifically important to protect children and adolescents. For individuals who have a tendency to burn in the sun, active protective measures must be taken throughout life
7. Apply strictly regulations aimed at preventing any exposure to known cancer-causing substances. Follow all health and safety instructions on substances which may cause cancer. Follow advice of national radiation protection offices

There are public health programs that could prevent cancers developing or increase the probability that a cancer may be cured

8. Women from 25 years of age should participate in cervical screening. This should be within programs with quality control procedures in compliance with European Guidelines for Quality Assurance in Cervical Screening
9. Women from 50 years of age should participate in breast screening. This should be within programs with quality control procedures in compliance with European Guidelines for Quality Assurance in Mammography Screening
10. Men and women from 50 years of age should participate in colorectal screening. This should be within programs with built-in quality assurance procedures
11. Participate in vaccination programs against hepatitis B virus infection

Other measures

12. See a doctor if you notice a lump, a persistent wound (including inside the mouth), changes in shape, color, or size of a mole, any abnormal bleeding
13. See a doctor if you have persistent symptoms such as a chronic cough or persistent hoarseness, a change in bowel habits / urination, or unexpected weight loss

Chemoprevention

Def: Prevention of tumor development via prophylactic medication.

Th: Colorectal Tumors
- Retrospective studies demonstrate risk reduction through regular use of acetylsalicylic acid or non-steroidal antiinflammatory drugs (NSAIDs).
- Prospective studies showed decreased numbers of adenomas, but no significant influence on carcinoma-related mortality → General use of acetylsalicylic acid or NSAIDs for the prevention of colorectal tumors is presently not recommended due to the possible side effects.
Breast Cancer
- Positive family history and/or identification of the BRCA-1 and BRCA-2 genes constitute a higher risk. However, the extent of this risk remains uncertain. Recent studies have shown that women carrying the genes have up to an 80% lifetime risk of developing the disease by the age of 80.
- Initial larger studies using tamoxifen in high-risk populations showed a positive influence on the disease risk. Consequently, the US National Cancer Institute (NCI) formulated a recommendation for the prophylactic use of tamoxifen in patients at risk of developing breast cancer. At present, this recommendation is judged controversial as other studies failed to reproduce the initial results or have even shown a negative influence of tamoxifen → Outside of studies, tamoxifen use should be limited to clearly defined high-risk populations. Frequent follow-up is required due to the increased risk of endometrial carcinoma.

Cervical Carcinoma
Vaccination against human papillomavirus type 16 (HPV-16) prevents intraepithelial cervical neoplasias.

Lung Cancer
Two large studies were conducted on the influence of protective substances in high-risk populations:
- ATBC study: administration of alpha-tocopherol (vitamin E) and β-carotene
- CARET study: administration of β-carotene and retinol

Neither study showed any benefit in relation to the occurrence of lung cancer. Instead, mortality was increased in the β-carotene group (higher incidence of bronchial carcinomas and myocardial infarction). Hence, further similar studies were discontinued.

Head and Neck Tumors
Patients with successfully removed head and neck tumors show a reduced incidence of metachronous secondary tumors after prophylactic use of retinoids. However, retinoids appeared to have no influence on relapse frequency or metastasis of the primary tumor.

Xeroderma Pigmentosum
The use of retinoids also had a positive effect in known cases of xeroderma pigmentosum.

Selenium
Clinical studies do not conclusively verify the usefulness of selenium substitution. While substitution is useful in selenium deficient areas (e.g., China), it seems to have no protective effect in areas with sufficient selenium supply (e.g., Germany). Results of current clinical studies remain to be seen.

Secondary Prevention (Cancer Screening)

Def:
Cancer screening remains the main focus of prophylaxis. Its benefits are, however, still subject to debate.
- On the one hand, there is definite increase in cure rates and prolonged life expectancy in early stages of tumor development.
- On the other hand, there is lead time bias and diagnosis of asymptomatic tumors which have no influence on life expectancy (“over-diagnosis bias”).
- Furthermore, false-positive screening results lead to increased technology-intensive and invasive diagnostic procedures with a higher risk of acute and chronic side effects (exposure to radiation, risk of invasive measures, etc.).

Meth:
The following World Health Organization (WHO) criteria are adequate guidelines for screening measures.
WHO criteria for sensible and effective cancer screening programs

- The disease should be an important health problem
- There should be an accepted treatment
- There should be facilities for diagnosis and treatment of the disease
- The disease should have a detectable preclinical phase
- The natural history of the disease should be understood
- A suitable screening test should be available
- The test should be acceptable to the general public
- There should be a generally accepted strategy for determining whom to treat
- The costs generated should be acceptable
- The program should be designed to carry out screening continuously

Cancer Screening Programs

Cancer screening programs are considered standard medical care for:

- Cervical and endometrial carcinoma → women from 20 years of age
- Breast cancer → women from 30 years of age
- Colorectal cancer → women and men from 45 years of age
- Prostate cancer → men from 45 years of age
- Malignant skin tumors → women from 30 years of age / men from 45 years of age.

International publications have firmly established the benefits of screening for:

- Colorectal cancer
- Breast cancer in postmenopausal women
- Cervical carcinoma

Up to now, the exact benefits of screening for prostate cancer have not been verified by published studies. There is a positive trend toward using mammography to screen for breast cancer in premenopausal women. Screening for malignant melanoma is also recommended, especially given the low costs involved and the importance of early treatment. There are no recommendations for lung cancer and ovarian carcinoma. In both cases, currently published studies do not show any correlation between detection by screening and decreased mortality.

Ref:


Web: