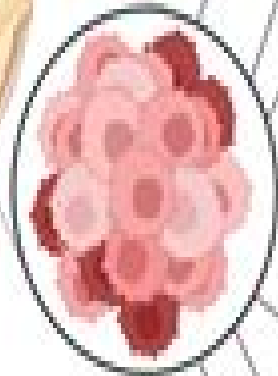
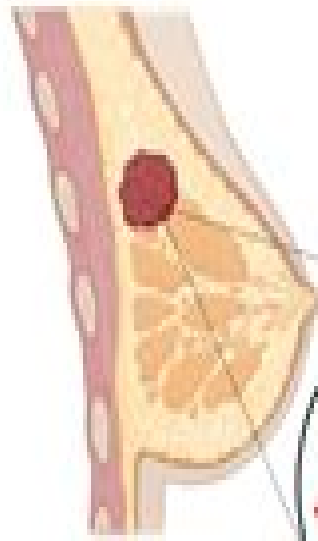


# The 7 Main Molecular Subtypes of Breast Cancer



**Receptors**  
 HR: Hormone  
 ER: Estrogen receptor  
 PR: Progesterone receptor  
 HER2: Human Epidermal Growth Factor receptor 2

**Luminal A (~40%)**  
 HR+ (ER+ and/or PR+), HER2-

- Most prevalent subtype and targeted therapy is Tamoxifen.
- MicroRNAs miR-10, miR-200a, and miR-181a are potential biomarkers of this breast cancer type that may assist in regulation.
- Examples: ZR-75-1, T-47D, MCF-7, MDA-MB-415

**Luminal B (10-20%)**  
 HR+ (ER+ and/or PR+), HER2+/-

- High levels of Ki-67 with fast cancer cell growth
- MicroRNAs miR-155, miR-125b, miR-4216 are potential biomarkers associated with this breast cancer type that may assist in therapeutic intervention.
- Examples: MDA-MB-320, ZR-75-30

**Luminal HER2 (5-10%)**  
 HR+ (ER+ and/or PR+), HER2+

- High levels of Ki-67 with faster cancer cell growth
- MicroRNAs miR-21, miR-200, miR-27b are potential biomarkers associated with this breast cancer type that may assist in targeting during experimentation.
- Examples: BT-474, MDA-MB-361, UACC-812

**HER2-enriched (15-20%)**  
 HR- (ER-, PR-), HER2+

- Overexpression of receptor HER2 and targeted therapy Herceptin.
- miR-147-3p has been linked with having the actions of a tumor suppressor gene within this breast cancer type that may regulate tumor function and development.
- Examples: AUA65, MDA-MB-453, HCC156A, SUM1HOPT, SK-BR-3

**Triple Negative (10-15%)**  
 HR- (ER-, PR-), HER2-

- Highest association to BRCA1 mutation and most aggressive type.
- Chemotherapy and experimental therapy are prevalent for this breast cancer type.

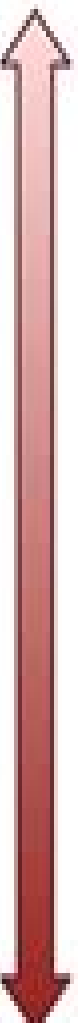
**Basal-like (~10%)**  
 HR- (ER-, PR-), HER2-

- Subset of Triple-Negative
- Enriched with basal markers such as cytokeratins and integrins.
- Examples: SUM229P, HCC70, BT-20, CAL 148

**Normal-like (~5%)**  
 HR- (ER-, PR-), HER2-

- Subset of Triple-Negative, also called claudin-low
- Over-express genes associated with tumor invasive and aggressive features
- Examples: BT-549, MDA-MB-157, MDA-MB-231, Hs 5787

Best prognosis



Worst prognosis

# Cancer Cell Lines

**Simon P. Langdon**



## **Cancer Cell Lines:**

*Cancer Cell Lines Part 1* John R. W. Masters, Bernhard Palsson, 1999 This series provides the first complete guide to the culture of human cells It is a detailed manual and reference resource for researchers in every aspect of medicine biology technology and immunobiology using human cells Every chapter is written by an internationally recognised authority in the field The first three volumes in the series provide a comprehensive text on the culture of established cell lines from every type of human cancer They provide a basic manual and reference resource for every cancer research scientist using human cancer cells

Cancer Cell Lines Part 2 John Masters, Bernhard Ø Palsson, 2006-04-11 Continuous cell lines derived from human cancers are the most widely used resource in laboratory based cancer research The first 3 volumes of this series on Human Cell Culture are devoted to these cancer cell lines The chapters in these first 3 volumes have a common aim Their purpose is to address 3 questions of fundamental importance to the relevance of human cancer cell lines as model systems of each type of cancer 1 Do the cell lines available accurately represent the clinical presentation 2 Do the cell lines accurately represent the histopathology of the original tumors 3 Do the cell lines accurately represent the molecular genetics of this type of cancer The cancer cell lines available are derived in most cases from the more aggressive and advanced cancers There are few cell lines derived from low grade organ confined cancers This gap can be filled with conditionally immortalized human cancer cell lines We do not know why the success rate for establishing cell lines is so low for some types of cancer and so high for others The histopathology of the tumor of origin and the extent to which the derived cell line retains the differentiated features of that tumor are critical The concept that a single cell line derived from a tumor at a particular site is representative of tumors at that site is naive and misleading

**Cancer Cell Lines** Bernhard Ø Palsson, John Masters, 2006-04-11 This book describes all human leukemia lymphoma cell lines that have been established and that grow continuously under standardised in vitro conditions These lines are derived from cells belonging to all the major hematopoietic cell lineages i e B and T lymphocytes natural killer cells granulocytic cells and megakaryocytic cells The clinical data the culture conditions and the major phenotypic features of the cell lines are described with citations This book is the first book describing human leukemia lymphoma cell lines and will be of interest to scientists involved in the areas of hematology oncology immunology molecular biology and cytogenetics Cancer Cell Lines Volumes 1 3 These 3 volumes provide a comprehensive text on the culture of established cell lines from every type of human cancer The volumes provide a basic manual and reference resource for every cancer research scientist using human cancer cells

*Atlas of Human Tumor Cell Lines* Robert K.M. Hay, Jae-Gahb Park, Adi Gazdar, 2013-10-22 Human tumor cells in culture are valuable for studying cancer causes and properties This convenient reference provides useful information for cancer researchers on commonly used established tumor cell lines of the major human organ systems Atlas of Human Tumor Cell Lines includes data about morphological metabolic genetic and growth characteristics of human tumor cells with morphological characteristics

presented in more than 250 photomicrographs It also contains information for establishing and maintaining human tumor cell lines in culture and each chapter covers future perspectives Covers well characterized tumor cell lines from the major human organ systems Presents over 250 photomicrographs both phase contrast and electron micrographs Includes a list of key references for each chapter Written by world renowned experts *Cancer Cell Lines* John Masters, Bernhard Ø Palsson, 2013-11-13 Continuous cell lines derived from human cancers are the most widely used resource in laboratory based cancer research The first 3 volumes of this series on Human Cell Culture are devoted to these cancer cell lines The chapters in these first 3 volumes have a common aim Their purpose is to address 3 questions of fundamental importance to the relevance of human cancer cell lines as model systems of each type of cancer 1 Do the cell lines available accurately represent the clinical presentation 2 Do the cell lines accurately represent the histopathology of the original tumors 3 Do the cell lines accurately represent the molecular genetics of this type of cancer The cancer cell lines available are derived in most cases from the more aggressive and advanced cancers There are few cell lines derived from low grade organ confined cancers This gap can be filled with conditionally immortalized human cancer cell lines We do not know why the success rate for establishing cell lines is so low for some types of cancer and so high for others The histopathology of the tumor of origin and the extent to which the derived cell line retains the differentiated features of that tumor are critical The concept that a single cell line derived from a tumor at a particular site is representative of tumors at that site is naive and misleading

Cancer Cell Lines Part 1 John Masters, Bernhard Ø Palsson, 1998-10-31 Continuous cell lines derived from human cancers are the most widely used resource in laboratory based cancer research The first 3 volumes of this series on Human Cell Culture are devoted to these cancer cell lines The chapters in these first 3 volumes have a common aim Their purpose is to address 3 questions of fundamental importance to the relevance of human cancer cell lines as model systems of each type of cancer 1 Do the cell lines available accurately represent the clinical presentation 2 Do the cell lines accurately represent the histopathology of the original tumors 3 Do the cell lines accurately represent the molecular genetics of this type of cancer The cancer cell lines available are derived in most cases from the more aggressive and advanced cancers There are few cell lines derived from low grade organ confined cancers This gap can be filled with conditionally immortalized human cancer cell lines We do not know why the success rate for establishing cell lines is so low for some types of cancer and so high for others The histopathology of the tumor of origin and the extent to which the derived cell line retains the differentiated features of that tumor are critical The concept that a single cell line derived from a tumor at a particular site is representative of tumors at that site is naive and misleading Cancer Cell Lines Bernhard Ø Palsson, John Masters, 2000-11-30 This book describes all human leukemia lymphoma cell lines that have been established and that grow continuously under standardised in vitro conditions These lines are derived from cells belonging to all the major hematopoietic cell lineages i e B and T lymphocytes natural killer cells granulocytic cells and megakaryocytic cells The clinical data the culture conditions and the major

phenotypic features of the cell lines are described with citations This book is the first book describing human leukemia lymphoma cell lines and will be of interest to scientists involved in the areas of hematology oncology immunology molecular biology and cytogenetics Cancer Cell Lines Volumes 1 3 These 3 volumes provide a comprehensive text on the culture of established cell lines from every type of human cancer The volumes provide a basic manual and reference resource for every cancer research scientist using human cancer cells *Cancer Cell Culture* Simon P. Langdon,2008-02-01 The culture of cancer cells is routinely practiced in many academic research centers biotechnology companies and hospital laboratories Cancer Cell Culture Methods and Protocols describes easy to follow methods to guide both novice and more experienced researchers seeking to use new techniques in their laboratories Our present understanding of the cell and molecular biology of cancer has been derived mainly from the use of cultured cancer cells and we cover a number of the most widely used assays to study function in current use Part I introduces the basic concept of cancer cell culture and this is followed by a description of the general techniques used in many cell culture facilities The importance of cell line characterization is now widely recognized and methods to characterize and authenticate cell lines are described in Part II Part III covers the isolation and development of specific cancer cell types and provides valuable tips for those wishing to derive new cell line models A wide range of procedures encompassing many of the key functional features of cancer cells are described in Part IV including assays to evaluate clonogenicity cell proliferation apoptosis adhesion migration invasion senescence angiogenesis and cell cycle parameters Methods to modify cancer cells are described in Part V including protocols for transfection development of drug resistance immortalization and transfer in vivo In Part VI methods of coculture of different cell types and contamination of cell lines are covered Cancer Cell Lines John R. W. Masters,Bernhard Palsson,2000 **The Morphologies of Breast Cancer Cell Lines in Three-dimensionalassays Correlate with Their Profiles of Gene Expression** ,2007 3D cell cultures are rapidly becoming the method of choice for the physiologically relevant modeling of many aspects of non malignant and malignant cell behavior ex vivo Nevertheless only a limited number of distinct cell types have been evaluated in this assay to date Here we report the first large scale comparison of the transcriptional profiles and 3D cell culture phenotypes of a substantial panel of human breast cancer cell lines Each cell line adopts a colony morphology of one of four main classes in 3D culture These morphologies reflect at least in part the underlying gene expression profile and protein expression patterns of the cell lines and distinct morphologies were also associated with tumor cell invasiveness and with cell lines originating from metastases We further demonstrate that consistent differences in genes encoding signal transduction proteins emerge when even tumor cells are cultured in 3D microenvironments **Advances in Drug discovery and Quality Evaluation** Xuetao Xu,Xi Zheng,Xiping Cui,2023-11-24 Drug discovery and quality evaluation are very important for human health Drugs from chemical synthesis and natural products are a very important branch in drug discovery The highly efficient synthetic methodology development and pharmacological evaluation of related active agents as essential steps to

developing corresponding innovative drugs are always research frontiers for organic chemists and medicinal chemists. Meanwhile the drug quality evaluation is an important guarantee for the clinical application of drugs and the efficacy of drugs. Therefore we wanted to organize this article collection for the presentation of the high quality work from internationally recognized researchers to promote academic communication among scientific researchers focusing on medicinal and pharmaceutical chemistry. In recent years the research community has witnessed significant advances in the development of the discovery of novel natural products design and synthesis of bioactive molecules synthetic methodology and drug quality evaluation. Therefore we hope to be able to summarize and display the latest developments in the design and synthesis of bioactive molecules synthetic methodologies the discovery of novel natural products as well as drugs quality evaluation through the collection of this album and provide new methods and template molecules for the subsequent development of innovative drug molecules.

Exploration of Natural Product Leads for Multitarget-Based Treatment of Cancer - Computational to Experimental Journey Rajeev K. Singla, Marcus Scotti, Supratik Kar, 2022-03-14

*Epigenetics Traits in Mammalian Tissues. From New Technology to New Hypotheses* Michael E. Symonds, Rafael Franco, 2019-09-23

How with the same genome a neuron is so different from a muscle cell. In Eva Jablonka and Lamb's words epigenetics is one of the four dimensions of evolution. Actually epigenetics should explain anything which occurs in living cells that cannot be only explained by the genes genome. After decades thinking and acting as if the genome determined the absolute fate of any life form on Earth the relevance of epigenetics for mammalian life disease and death is now recognized. In fact assuming similar genomes lifespan lifestyle and risk of diseases etc results from a balance between genes and epigenetic traits. The Research Topic aimed to show the differences of epigenetic traits between tissues their physiological relevance and potential to target epigenetic mechanisms in human diseases.

**Exploring Context-specific Genetic Vulnerabilities in Human Cancer Cell Lines** Eun Jee Koh, 2016

**Phenotypic screening in the 21st century** Gul Erdemli, Birgit T Priest, 2015-04-21

In the genomic era of 1990s 2000s pharmaceutical research moved to target based drug discovery which enabled development of a number of small molecule drugs against a wide range of diseases. In many cases however drugs that arose from genomics failed questioning the validity of the targets and the suitability of target based drug discovery as an optimal strategy for all disease states. For monogenic diseases target based approaches may be well suited to the identification of novel therapies. Most diseases however are caused by a combination of several genetic and environmental factors and are likely to require simultaneous modulation of multiple molecular targets pathways for successful treatment. For such diseases reductionist approaches focusing on individual targets rather than biological networks are unlikely to succeed and new drug development strategies are required. In search of more successful approaches the pharmaceutical industry is moving towards phenotypic screening beyond individual genes targets. However this requires rethinking of diseases and drug discovery approaches from a network and systems biology perspective. Since returning to the pre genomics era of screening drug candidates in laborious

animal models is not a feasible solution the industry needs to evolve a new paradigm of phenotypic drug discovery within the context of systems biology Such a paradigm must combine physiologically and disease relevant biological substrates with sufficient throughput operational simplicity and statistical vigour Biomarker strategies for translational medicine as well as preclinical safety and selectivity assessments would also need to be revised to adapt to the target agnostic style This focused issue aims to discuss strategies key concepts and technologies related to systems based approaches in drug development Design and implementation of innovative biological assays featuring multiple target strategies and rational drug design in the absence of target knowledge during the early drug discovery are illustrated with examples Specific topics include The need for systems based approaches in drug development Phenotypic screening strategies Compound libraries natural product inspired compound collections Target deconvolution and identification Target agnostic lead discovery and optimization Multi target approaches and decoding the phenotype understanding biological interactions and multiscale systems modelling Translational aspects Early evaluation of selectivity and safety in a target agnostic manner

**Comparative Analysis of Two Human Cancer Cell Lines Following Exposure to Low Dose Radiation** Gladys N. Nangami, 2011 Over the past two decades studies on the cellular response to very low dose radiation have been revolutionizing historically held paradigms of cellular radioresponse Indeed a host of seemingly contradictory events have recently been reported to occur within this dose range of radiation exposure which make extrapolation of data derived from high dose studies to these low dose ranges no longer a feasible alternative In this study we investigate the radioresponse of two human tumor cell lines A375 human melanoma cells and PC3 human prostate cancer cells which appear to behave quite differently in the very low dose radiation range More specifically we a characterize the cell survival response following low dose radiation in the A375 human melanoma cells and PC3 human prostate cancer cell lines b investigate the kinetics and magnitude of cell cycle arrest that occurs following low dose radiation exposure in these cell lines and c ascertain whether signaling through the MAPK and NF kB proliferative pathways is being stimulated following exposure to low doses of radiation The results of these studies demonstrate that two different and contradictory survival responses are seen following exposure to very low dose irradiation hyper radioresistance in A375 cells vs hyper radiosensitivity in PC3 cells Furthermore the data indicate that differential regulation of G2 M cell cycle arrest may be involved in the contradictory survival responses observed

Advances in Molecular Pathology 2018 ,2018-10-09 This inaugural issue of Advances in Molecular Pathology will provide a comprehensive review of the most current practices trends and developments in the field of Molecular Pathology Publishing on an annual basis the volume will be divided into 7 sections Genetics Hematopathology Infectious Disease Pharmacogenomics Informatics Solid tumors and Identity HLA Led by Dr Gregory Tsongalis of Dartmouth University a team of experienced pathologists from institutions across the country oversee annual topic and expert author selection Topics discussed in this volume include but are not limited to whole genome sequencing in critically ill children bioinformatics in clinical genomic sequencing

comprehensive monitoring of patients with chronic myeloid leukemia genetic biomarkers in the biology and clinical workup of chronic lymphocytic leukemia metagenomics in infectious disease point of care molecular testing pharmacogenomics in oncology clinical uses of panel testing vs single gene testing large scale data sharing initiatives in genomic oncology clinical NGS assays for solid tumors emerging concepts in liquid biopsy the cell line and tissue misidentification problem and cell line detective work

**Edible and Medicinal Plants: From Ethnopharmacological Practices to Interdisciplinary Approaches and Regulations** X. Y. Zhang,Alberto Carlos Pires Dias,Norberto Peporine Lopes,2023-02-27 **Anticancer Research** ,2007

*Human Tumor Cells in Vitro* Jørgen Fogh,1975 The study of cultured human tumor cells is a most obvious approach in experimental human cancer research For many techniques in virology immunology biochemistry and biophysics for example large amounts of cells may be required and such quantities are usually provided only when the cultures develop into established cell lines when this happens thorough characterization also becomes possible The development of cell lines therefore is of prime importance Recent major advances in research with animal cell systems seem to be a prologue for present and future efforts directed toward work with human tumor cells in culture Conceivably the most significant results in cancer research may develop from work with such cells and so the time seemed right to define the present state of our knowledge This is the first book dedicated exclusively to the subject human tumor cells in vitro Although some of the fundamental aspects in the cultivation of human tumor cells and the extent to which they represent human cancer in vivo are still unclear I asked a number of the leading investigators in this area of research to collect and evaluate previous and present contributions and to offer their thoughts on the questions to which answers are not yet available Many of the chapters are concerned with techniques of cultivation Cultures from some types of tumors have grown well in many cases they have given rise to established cell lines



## Unveiling the Power of Verbal Art: An Emotional Sojourn through **Cancer Cell Lines**

In a world inundated with screens and the cacophony of fast transmission, the profound energy and psychological resonance of verbal art frequently fade in to obscurity, eclipsed by the constant assault of noise and distractions. Yet, situated within the lyrical pages of **Cancer Cell Lines**, a fascinating perform of fictional elegance that pulses with natural emotions, lies an remarkable journey waiting to be embarked upon. Published by way of a virtuoso wordsmith, this magical opus guides readers on a psychological odyssey, lightly revealing the latent possible and profound influence embedded within the intricate web of language. Within the heart-wrenching expanse with this evocative analysis, we shall embark upon an introspective exploration of the book is central subjects, dissect its charming writing model, and immerse ourselves in the indelible impact it leaves upon the depths of readers souls.

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