

## A CHROMOSOME STUDY

In this activity, you will create a karyotype from a page of mixed chromosomes. Karyotypes are created by matching homologous pairs and numbering them from largest to smallest. Abnormalities, such as extra or deleted chromosomes can then be diagnosed. Pictured chromosomes will be used for this model rather than real chromosomes, but the process is the same for real chromosomes extracted from cell or fetal samples.

Two karyotypes will be created - A karyotype is a pattern or picture of chromosomes from one cell **grouped into pairs** and **organized by size**. The first you will create represents a normal human karyotype of a male or a female, the second represents and abnormal karyotype. You will then compare and diagnose the abnormality present in the patient of the second karyotype.



### Normal Human Karyotype

- Obtain the page marked "normal" - these are pictures of chromosomes from a normal human.
- Cut each chromosome out and set the ones labeled X & Y aside.
- Pair each chromosome up with its match - the X & Y will not match.
- Arrange the chromosomes in pairs from largest to smallest. **NUMBER** them starting from one.
- Place the sex chromosomes last, at the #23 spot.

1. How many total chromosomes are present in this karyotype? \_\_\_\_\_

2. How many sex chromosomes are present? \_\_\_\_\_

How many autosomes (not sex chromosomes)? \_\_\_\_\_

3. What is your person's sex chromosomes (XX or XY)? \_\_\_\_\_ Is this a boy or girl? \_\_\_\_\_

Body cells are called somatic cells. Somatic cells include the skin, liver, muscle, stomach and other bodily cells. The karyotype you prepared is from a somatic human cell. The term **diploid chromosome number** refers to the number of chromosomes in a somatic cell. The diploid number varies from species to species, however it does not differ from somatic cell to somatic cell within the same organism. To find your diploid number, simply count the number of chromosomes in your karyotype.

4. What is the diploid chromosome number for your karyotype? \_\_\_\_\_

The **HAPLOID CHROMOSOME NUMBER** refers to the number of chromosomes in an organism's sex cells. Sperm in males, eggs in females. The **haploid number**, is always -half- that of the diploid number.

5. What would the haploid chromosome number for your karyotype be? \_\_\_\_\_

### Abnormal Human Karyotype

- Obtain the page marked "abnormal" - there is more than one set, take note of which set you have (A, B, C, D) → \_\_\_\_\_
- Cut each chromosome out and set any labeled ones (X, Y) aside.
- Pair each chromosome up with its match - the X & Y will not match.
- Arrange the chromosomes in pairs from largest to smallest. **NUMBER** them starting from one.
- Place the sex chromosomes last, at the #23 spot.

# Lab 21 A Chromosome Study Answer Key

**Torbjoern Caspersson**



## **Lab 21 A Chromosome Study Answer Key:**

Handbook of Autopsy Practice Jurgen Ludwig, 2002-07-18 The second edition of Handbook of Autopsy Practice appeared in 1979 under the title Current Methods of Autopsy Practice W B Saunders Company that edition was out of print in the early 1980s Now over 20 years later it appeared timely to thoroughly update the material in a third edition by adding what we have learned in the meantime and eliminating text that has become obsolete There is an acute need for a complete and readily accessible resource for autopsy work because few pathologists still specialize in autopsy practice and as a consequence expertise in autopsy technology and autopsy pathology has declined Our colleagues in the forensic field have remained the only large group of autopsy practitioners For most other pathologists the economic situation time constraints and the steadily decreasing autopsy rates have made a career in autopsy pathology unattractive This state of affairs is perpetuated by a lack of interest among many of our young colleagues partly because the teaching of autopsy pathology and autopsy techniques during most residencies is insufficient Numerous articles have been written about this situation but the trend I fear is irreversible Still autopsies will be requested particularly in complex and difficult situations where the questions remaining after the death of the patient might challenge even experienced autopsy pathologists Under these circumstances this Handbook of Autopsy Practice should meet a particular need by providing the prosecutor with a source of information when it is most required in the autopsy room

The AGT Cytogenetics Laboratory Manual Marilyn S. Arsham, Margaret J. Barch, Helen J. Lawce, 2017-04-24 Cytogenetics is the study of chromosome morphology structure pathology function and behavior The field has evolved to embrace molecular cytogenetic changes now termed cytogenomics Cytogeneticists utilize an assortment of procedures to investigate the full complement of chromosomes and or a targeted region within a specific chromosome in metaphase or interphase Tools include routine analysis of G banded chromosomes specialized stains that address specific chromosomal structures and molecular probes such as fluorescence in situ hybridization FISH and chromosome microarray analysis which employ a variety of methods to highlight a region as small as a single specific genetic sequence under investigation The AGT Cytogenetics Laboratory Manual Fourth Edition offers a comprehensive description of the diagnostic tests offered by the clinical laboratory and explains the science behind them One of the most valuable assets is its rich compilation of laboratory tested protocols currently being used in leading laboratories along with practical advice for nearly every area of interest to cytogeneticists In addition to covering essential topics that have been the backbone of cytogenetics for over 60 years such as the basic components of a cell use of a microscope human tissue processing for cytogenetic analysis prenatal constitutional and neoplastic laboratory safety and the mechanisms behind chromosome rearrangement and aneuploidy this edition introduces new and expanded chapters by experts in the field Some of these new topics include a unique collection of chromosome heteromorphisms clinical examples of genomic imprinting an example driven overview of chromosomal microarray mathematics specifically geared for the cytogeneticist usage of ISCN s

cytogenetic language to describe chromosome changes tips for laboratory management examples of laboratory information systems a collection of internet and library resources and a special chapter on animal chromosomes for the research and zoo cytogeneticist The range of topics is thus broad yet comprehensive offering the student a resource that teaches the procedures performed in the cytogenetics laboratory environment and the laboratory professional with a peer reviewed reference that explores the basis of each of these procedures This makes it a useful resource for researchers clinicians and lab professionals as well as students in a university or medical school setting

**Handbook of Autopsy Practice** Brenda L. Waters, 2010-05-19 Handbook of Autopsy Practice Fourth Edition is divided into three parts Part I contains six new chapters in which the reader will find an assortment of tools that will increase the value of the autopsy Included in the section are valuable resources and tools such as a sample next of kin letter a quality assurance worksheet new discourse on the dissection procedure which is accompanied by a worksheet and template for the gross description There is also a new detailed discussion of the safe handling of sharps complete with photographs and the reader will also find the updated requirements of the Eye Bank of America and the U S Food and Drug Administration for ocular tissue transplantation Part II has been updated with new diseases and recent references added Practicing autopsy pathologists residents and students are invited to review this alphabetical listing of disorders before each autopsy in order to re acquaint themselves with what they might encounter Part III provides a series of tables providing organ weights and body measurements for fetuses children and adults Handbook of Autopsy Practice Fourth Edition is an essential resource for clinicians pathologists residents and students who strive to hone their trade and increase the value of the autopsies they perform

*Cytogenetic Laboratory Management* Susan Mahler Zneimer, 2016-11-21 Cytogenetic Laboratory Management Cytogenetic Laboratory Management Chromosomal FISH and Microarray Based Best Practices and Procedures Cytogenetic Laboratory Management Chromosomal FISH and Microarray Based Best Practices and Procedures is a practical guide that describes how to develop and implement best practice processes and procedures in the genetic laboratory setting The text first describes good laboratory practices including quality management design control of tests and FDA guidelines for laboratory developed tests and preclinical validation study designs The second focus of the book is on best practices for staffing and training including cost of testing staffing requirements process improvement using Six Sigma techniques training and competency guidelines and complete training programs for cytogenetic and molecular genetic technologists The third part of the text provides stepwise standard operating procedures for chromosomal FISH and microarray based tests including preanalytic analytic and postanalytic steps in testing which are divided into categories by specimen type and test type All three sections of the book include example worksheets procedures and other illustrative examples that can be downloaded from the Wiley website to be used directly without having to develop prototypes in your laboratory Providing a wealth of information on both laboratory management and molecular and cytogenetic testing Cytogenetic Laboratory Management will be an essential tool for laboratorians

worldwide in the field of laboratory testing and genetic testing in particular This book gives the essentials of Developing and implementing good quality management programs in laboratories Understanding design control of tests and preclinical validation studies and reports FDA guidelines for laboratory developed tests Use of reagents instruments and equipment Cost of testing assessment and process improvement using Six Sigma methodology Staffing training and competency objectives Complete training programs for molecular and cytogenetic technologists Standard operating procedures for all components of chromosomal analysis FISH and microarray testing of different specimen types This volume is a companion to Cytogenetic Abnormalities Chromosomal FISH and Microarray Based Clinical Reporting The combined volumes give an expansive approach to performing reporting and interpreting cytogenetic laboratory testing and the necessary management practices staff and testing requirements Laboratory Hematology Practice Kandice Kottke-Marchant, Bruce Davis, 2012-06-06 Expertly edited and endorsed by the International Society for Laboratory Hematology this is the newest international textbook on all aspects of laboratory hematology Covering both traditional and cutting edge hematology laboratory technology this book emphasizes international recommendations for testing practices Illustrative case studies on how technology can be used in patient diagnosis are included Laboratory Hematology Practice is an invaluable resource for all those working in the field Journal National Cancer Institute (U.S.), 1965 **Nuclear Science Abstracts** , 1973

**Government-wide Index to Federal Research & Development Reports** , 1966 **NBS Special Publication** , 1968

Laboratory Tests and Diagnostic Procedures Cynthia C. Chernecky, Barbara J. Berger, 2012-12-01 Find complete answers to questions such as which laboratory tests to order or what the results might mean Laboratory Tests and Diagnostic Procedures 6th Edition covers more tests than any other reference of its kind with over 900 lab tests and diagnostic procedures in all In Part I you ll find an alphabetical list of hundreds of diseases conditions and symptoms including the tests and procedures most commonly used to confirm or rule out a suspected diagnosis In Part II you ll find descriptions of virtually every laboratory and diagnostic test available This edition is updated with the latest research and over 20 NEW test entries Written by educator Cynthia Chernecky and clinical nurse specialist Barbara Berger this lab reference covers today s lab tests with concise easy to use information More than 900 laboratory tests and diagnostic procedures are included more than any other reference Over 600 diseases conditions and symptoms are listed along with the tests used to confirm them Alphabetical organization and A to Z thumb tabs make it easy to find the information you re looking for Alternative test names and acronyms are cross referenced to simplify lookup Instructions for client and family teaching help you offer guidance concerning test preparation and follow up care Age and gender specific norms are provided giving you complete lifespan coverage Risks and Contraindications are highlighted to help you safeguard your patients and provide effective care Panic Level Symptoms and Treatment are provided for dangerously increased and decreased levels Minimum volumes for blood samples are included useful when a client s blood preservation is essential as well as information on whether blood

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*Clinical Laboratory Hematology* Shirlyn B. McKenzie, 2004 Designed to meet the needs of both clinical laboratory technicians and clinical laboratory scientists this comprehensive yet easy to read guide to hematology and hemostasis features cutting edge technologies high quality photographs and micrographs case studies and convenient dual level basic and advanced presentation of information In each chapter two levels of objectives and questions are presented allowing content to fit specific course focus Case studies and checkpoints in each chapter help apply and assess comprehension Visual cross referencing symbols throughout make finding information exceptionally easy Features

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*The Science of Laboratory Diagnosis* John Crocker, David Burnett, 2005-12-17 This fully revised and updated edition of *The Science of Laboratory Diagnosis* provides a concise description of all common laboratory tests available in medical practice with notes on their application the accuracy of each test the historical background to the adoption of various tests and their effectiveness in diagnosis Well illustrated with clear headings tables flow charts and pathology slides most in full colour Provides an accessible reference book in which relevant information can be found easily Page design facilitates rapid assimilation of principles and key facts All the chapters have been updated and new material has been introduced to cover recently developed techniques such as fluid based cytology telepathology and proteomics

*The Science of Laboratory Diagnosis Second Edition* is an essential primary reference source for everyone working in a clinical laboratory This book is essential reading for pathologists biomedical scientists medical laboratory scientific officers and all clinicians involved in laboratory research

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**Clinical Maternal-Fetal Medicine** Hung N. Winn, Frank A. Chervenak, Roberto Romero, 2021-09-01 This is a comprehensive one stop online book relating to all areas of pregnancy and birth The second edition of this easily searchable guide is edited by eminent experts in the field and includes new contributions from international authors It will be an ideal reference for Maternal Fetal Specialists and Generalists wanting an authoritative

answer on any point Key features Grouped in to six topics modules for convenience Electronic search facility across all chapters Approximately 700 000 words of text 7000 references 300 figures including 100 in full colour and 200 tables available to search Key topics All common pregnancy and birth related problems such as diabetes and pregnancy Many rarer complications such as protozoan infections Fetal assessment which is absolutely central to MFM practice Medico legal aspects Sick cell disease a major problem for patients of African descent New chapters include Recurrent early pregnancy losses Invasive hemodynamic monitoring Chronic and acute hypertension Neurological disorders Maternal obesity Assessment of fetal genetic disorders First and second trimester screening      Scientific and Technical Aerospace Reports, 1977 Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database      Cumulated Index Medicus, 1972      Clinical Infertility and In Vitro Fertilization Botros R M B Rizk, Hassan N Sallam, 2012-06-15 This manual is a comprehensive guide to the causes and treatment of infertility Beginning with a section on male and female physiology the text then discusses various causes of infertility such as hypothalamic pituitary dysfunction endometriosis male factors the cervical factor and unexplained infertility The final section explores assisted reproductive technology including In Vitro Fertilisation IVF cryopreservation of embryos intra cytoplasmic sperm injection ICSI and fertility preservation in female cancer patients A final chapter presents ethical moral and religious issues Authored by recognised specialists in the USA Europe and Egypt this book contains more than 400 clinical and scientific images and illustrations to depict different conditions and surgical techniques      **Chromosome identification: Medicine and Natural Sciences** Torbjorn Caspersson, 1973-01-01 Chromosome Identification Technique and Applications in Biology and Medicine contains the proceedings of the Twenty Third Nobel Symposium held at the Royal Swedish Academy of Sciences in Stockholm Sweden on September 25 27 1972 The papers review advances in chromosome banding techniques and their applications in biology and medicine Techniques for the study of pattern constancy and for rapid karyotype analysis are discussed along with cytological procedures karyotypes in different organisms somatic cell hybridization and chemical composition of chromosomes This book is comprised of 51 chapters divided into nine sections and begins with a survey of the cytological procedures including fluorescence banding techniques constitutive heterochromatin C band technique and Giemsa banding technique The following chapters explore computerized statistical analysis of banding pattern the use of distribution functions to describe integrated profiles of human chromosomes the uniqueness of the human karyotype and the application of somatic cell hybridization to the study of gene linkage and complementation The mechanisms for certain chromosome aberration are also analyzed together with fluorescent banding agents and differential staining of human chromosomes after oxidation treatment This monograph will be of interest to practitioners in the fields of biology and medicine      Pathophysiology Kathryn L. McCance, Sue E. Huether, Clayton Parkinson, 2009-11-01 Master the content from your textbook with this helpful study tool



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