

Sex Chromosomes Of A Male

Sex Itself Sarah S. Richardson 2013-12-13 Human genomes are 99.9 percent identical—with one prominent exception. Instead of a matching pair of X chromosomes, men carry a single X, coupled with a tiny chromosome called the Y. Tracking the emergence of a new and distinctive way of thinking about sex represented by the unalterable, simple, and visually compelling binary of the X and Y chromosomes, *Sex Itself* examines the interaction between cultural gender norms and genetic theories of sex from the beginning of the twentieth century to the present, postgenomic age. Using methods from history, philosophy, and gender studies of science, Sarah S. Richardson uncovers how gender has helped to shape the research practices, questions asked, theories and models, and descriptive language used in sex chromosome research. From the earliest theories of chromosomal sex determination, to the mid-century hypothesis of the aggressive XYY supermale, to the debate about Y chromosome degeneration, to the recent claim that male and female genomes are more different than those of humans and chimpanzees, Richardson shows how cultural gender conceptions influence the genetic science of sex. Richardson shows how sexual science of the past continues to resonate, in ways both subtle and explicit, in contemporary research on the genetics of sex and gender. With the completion of the Human Genome Project, genes and chromosomes are moving to the center of the biology of sex. *Sex Itself* offers a compelling argument for the importance of ongoing critical dialogue on how cultural conceptions of gender operate within the science of sex.

Sex Determination in Plants CC Ainsworth 2004-08-02 Indispensable for all plant biologists, this is a fascinating and thorough examination of those factors which affect the sex determination of plant species, describing all of the main classes of plant with unisexual flowers hermaphrodite, monoecious and

The Evolution of Sex Determination Leo Beukeboom 2014-06-12 Sexual reproduction is a fundamental aspect of life. It is defined by the occurrence of meiosis and the fusion of two gametes of different sexes or mating types. Sex-determination mechanisms are responsible for the sexual fate and development of sexual characteristics in an organism, be it a unicellular alga, a plant, or an animal. In many cases, sex determination is genetic: males and females have different alleles or different genes that specify their sexual morphology. In animals, this is often accompanied by chromosomal differences. In other cases, sex may be determined by environmental (e.g. temperature) or social variables (e.g. the size of an organism relative to other members of its population). Surprisingly, sex-determination mechanisms are not evolutionarily conserved but are bewilderingly diverse and appear to have had rapid turnover rates during evolution. Evolutionary biologists continue to seek a solution to this conundrum. What drives the surprising dynamics of such a fundamental process that always leads to the same outcome: two sex types, male and female? The answer is complex but the ongoing genomic revolution has already greatly increased our knowledge of sex-determination systems and sex chromosomes in recent years. This novel book presents and synthesizes our current understanding, and clearly shows that sex-determination evolution will remain a dynamic field of future research. *The Evolution of Sex Determination* is an advanced, research level text suitable for graduate students and researchers in genetics, developmental biology, and evolution.

The Biology of Reproduction Giuseppe Fusco 2019-10-10 A look into the phenomena of sex and reproduction in all organisms, taking an innovative, unified and comprehensive approach.

Gendering the Genome Sarah S. Richardson 2009

The 7 Sexes Elof Axel Carlson 2013 Few of us know much about the biology of sex determination, but what could be more interesting than to discover how we are shaped into males and females? In this book, Elof Carlson tells the incredible story of the difficult quest to understand how the body forms girls and boys. Carlson's history takes us from antiquity to the present day to detail how each component of human reproduction and sexuality was identified and studied, how this knowledge enlarged our understanding of sex determination, and how it was employed to interpret such little understood aspects of human biology as the origin of intersex births.

Sex Determination in Fish T. J. Pandian 2011-09-02 This book is the first to report that research in allogenis/xenogenics has conclusively shown that fishes have retained bisexual potency even after sexual maturity and spermiation. The XY genotype found in the unexpected female phenotypes sired by supermales (Y1Y2) and androgenic males (Y2Y2) points out the need to employ sex specific molecular ma

Evolution of Sex Determining Mechanisms James J. Bull 1983

DNA Linda L. McCabe 2008-03-04 The genetic revolution has provided incredibly valuable information about our DNA, information that can be used to benefit and inform—but also to judge, discriminate, and abuse. An essential reference for living in today's world, this book gives the background information critical to understanding how genetics is now affecting our everyday lives. Written in clear, lively language, it gives a comprehensive view of exciting recent discoveries and explores the ethical, legal, and social issues that have arisen with each new development.

Exploring the Biological Contributions to Human Health Institute of Medicine 2001-07-02 It's obvious why only men develop prostate cancer and why only women get ovarian cancer. But it is not obvious why women are more likely to recover language ability after a stroke than men or why women are more apt to develop autoimmune diseases such as lupus. Sex differences in health throughout the lifespan have been documented. *Exploring the Biological Contributions to Human Health* begins to snap the pieces of the puzzle into place so that this knowledge can be used to improve health for both sexes. From behavior and cognition to metabolism and response to chemicals and infectious organisms, this book explores the health impact of sex (being male or female, according to reproductive organs and chromosomes) and gender (one's sense of self as male or female in society). *Exploring the Biological Contributions to Human Health* discusses basic biochemical differences in the cells of males and females and health variability between the sexes from conception throughout life. The book identifies key research needs and opportunities and addresses barriers to research. *Exploring the Biological Contributions to Human Health* will be important to health policy makers, basic, applied, and clinical researchers, educators, providers, and journalists-while being very accessible to interested lay readers.

Sex-linked Inheritance in Drosophila Calvin Blackman Bridges It has been found that when certain characters enter a cross together (i. e., from the same parent) their factors tend to pass into the same gamete of the hybrid, with the result that other ratios than the chance ratios described by Mendel are found in the F2 generation. Such cases of linkage have been described in several forms, but nowhere on so extensive a scale as in the pomace fly, *Drosophila ampelophila*. Here, over a hundred characters that have been investigated as to their linkage relations are found to fall into four groups, the members of each group being linked, in the sense that they tend to be transmitted to the gametes in the same combinations in which they entered from the parents. The members of each group give free assortment with the members of any of the other three groups. A most significant fact in regard to the linkage shown by the *Drosophila* mutants is that the number of linked groups corresponds to the number of pairs of the chromosomes. If the gens for the Mendelian characters are carried by the chromosomes we should expect to find demonstrated in *Drosophila* that there are as many groups of characters that are inherited together as there are pairs of chromosomes, provided the chromosomes retain their individuality. The evidence that the chromosomes are structural elements of the cell that perpetuate themselves at every division has continually grown stronger. That factors have the same distribution as the chromosomes is clearly seen in the case of sex-linked characters, where it can be shown that any character of this type appears in those individuals which from the known distribution of the X chromosomes must also contain the chromosome in question. For example, in *Drosophila*, as in many other insects, there are two X chromosomes in the cells of the female and one X chromosome in the cells of the male. There is in the male, in addition to the X, also a Y chromosome, which acts as its mate in synapsis and reduction. After reduction each egg carries an X chromosome. In the male there are two classes of sperm, one carrying the X chromosome and the other carrying the Y chromosome. Any egg fertilized by an X sperm produces a female; any egg fertilized by a Y sperm produces a male. The scheme of inheritance is as follows.

Sex, Size and Gender Roles Daphne J. Fairbairn 2007-07-05 This collection of 20 chapters written by leading evolutionary biologists from around the

globe provides a fascinating insight into the patterns and causes of differences between males and females in the natural world.

Roles of Sex Phenotype and Sex Chromosome Dosage in Sex-biased DNA Methylation Najla Alogayil 2021 "Females and males have different sets of sex chromosomes and produce different levels of gonadal sex hormones. They also differ in many aspects of their anatomy and physiology, susceptibility to disease, drug metabolism, gene expression levels, and DNA methylation patterns. The liver is a sexually dimorphic organ showing major sex differences in steroid and drug metabolism profiles, as well as sex differences in gene expression and DNA methylation. We have recently generated a catalogue of sex-biased differentially methylated regions (sDMRs) for mouse liver and demonstrated that sex-chromosome complement and the sex phenotype influence autosomal DNA methylation. The mechanisms by which the Y chromosome and the sex phenotype influenced DNA methylation remained unclear. In this project, we had two aims: first, to understand how the Y chromosome influences DNA methylation, and second, how the sex phenotypes influence DNA methylation. For our first aim, we hypothesized that Y-chromosome dependent sDMRs were specific for the B6.TIR strain, and genetic variation in the Y chromosome between B6.TIR and C57BL/6J (B6) influenced DNA methylation. To test this hypothesis, we compared the methylation levels of two Y-chromosome dependent sDMRs in B6 and B6.TIR animals. We also compared the expression of Y-linked genes that are expressed in the liver between the two strains. For our second aim, we hypothesized that androgen (testosterone) and estrogen (estradiol) signaling influenced DNA methylation through their receptors (androgen and estrogen receptors, respectively). To test this hypothesis, we examined the age dynamics of sex-biased methylation in B6 male and female mice, true hermaphrodites, and sex-reversed XY females. We also tested sex-biased methylation in the liver of androgen receptor knockout (ARKO) and estrogen receptor 1 knockout (ESR1KO) mice. Liver DNA samples were extracted from (1) B6 female and male mice at three different ages: embryonic day 14.5 (E14.5), 4 weeks, and 8 weeks after birth; (2) B6.TIR mice: XY males, hermaphrodites, and sex-reversed females, as well as XX females at 8 and 16 weeks of age; (3) XY ARKO and wild type littermates at 10-11 weeks of age; (4) homozygous and heterozygous ESR1KO mice and wild type littermates at 8 weeks of age. We examined DNA methylation levels using targeted pyrosequencing methylation assays at six sex-phenotype dependent sDMRs that were selected for their association with sex-biased expression: three with higher expression and lower methylation in male livers (male-biased sDMRs) and three with higher expression and lower methylation in female livers (female-biased sDMRs). To test if the timing of sex-biased methylation coincides with sex-biased gene expression, we performed RT-qPCR for two male-biased and two female-biased genes. We show that Y-chromosome dependent sDMRs are specific to the B6.TIR strain and Y-linked genes may contribute to the TIR-specific sex-biased methylation. We show that sex bias in DNA methylation and gene expression varies with age. At eight weeks, hermaphrodites showed either intermediate or female-like methylation levels, and they established a male-like methylation level at 16 weeks. Our results suggest that the presence of an ovary and a testis in the same mouse affects DNA methylation in an age-dependent manner. AR loss in male mice leads to the feminization of DNA methylation at sDMRs. Loss of ESR1 changes methylation levels of both females and males at male-biased sDMRs, and only females at female-biased sDMRs. In summary, we demonstrate that signaling of both estrogen and testosterone through their receptors contributes to sex-biased methylation in the mouse liver"--

Sex Chromosomes Cynthia N. Weingarten 2009 Sex chromosomes determine the sex of an organism. A human somatic cell has two sex chromosomes: XY in male and XX in female. A human germ cell has one sex chromosome: X or Y in a sperm and X in an egg. When an X-sperm is combined with an egg, the resulting zygote (fertilised egg) will contain two X chromosomes. A person developed from the XX-zygote will have the characteristics of a female. Combination of a Y-sperm and an egg will produce a male. Usually, a woman has two X chromosomes (XX) and a man one X and one Y (XY). However, both male and female characteristics can sometimes be found in one individual, and it is possible to have XY women and XX men. Analysis of such individuals has revealed some of the molecules involved in sex determination, including one called SRY, which is important for testis formation. SRY (which stands for sex-determining region Y gene) is found on the Y chromosome. In the cell, it binds to other DNA and in doing so distorts it dramatically out of shape. This alters the properties of the DNA and likely alters the expression of a number of genes, leading to testis formation. Most XX men who lack a Y chromosome do still have a copy of the SRY gene on one of their X chromosomes (moved there by chromosomal translocation). This copy accounts for their maleness. However, because the remainder of the Y chromosome is missing they frequently do not develop secondary sexual characteristics in the usual way. This book presents the latest research in the field from around the world.

The Y Chromosome and Male Germ Cell Biology in Health and Diseases Yun-Fai Lau 2007 The roles of mouse Y chromosome genes in spermatogenesis -- Male meiotic sex chromosome inactivation and meiotic silencing -- Insights into SRY action from sex reversal mutations -- The TSPY gene family -- Structure and function of AZFa locus in human spermatogenesis -- RBMY and DAZ in spermatogenesis -- Neurotrophic factors in the development of the postnatal male germ line -- Dickkopf-like 1-a protein unique to mammals that is associated both with formation of trophoblast stem cells and with spermatogenesis -- Antisense transcription in developing male germ cells -- The spermatogonial stem cell model -- Transplantation of germ cells and testis tissue -- Orthodox and unorthodox ways to initiate fertilization and development in mammals -- Pathogenesis of testicular germ cell tumors -- Origin of testicular germ cell neoplasia: the role of sex chromosomes.

Behaviour of heterochromatin and of the sex chromosomes during male meiosis of related rodent species Maria Teresa Zenzes 1973

Challenging Popular Myths of Sex, Gender and Biology Malin Ah-King 2013-11-27 This edited volume challenges popular notions of sex, gender and biology and features international, trans-disciplinary research. The book begins with an exploration of supposedly 'natural' sexual differences, then looks at research in evolutionary biology and examines topics such as gender stereotypes in humans. The first chapters explore important questions: What are the fundamental sex differences? How do genes and hormones influence an individual's sex? Subsequent chapters concern topics including: sex stereotypes in the field of sexual conflict, how the focus on genes in evolutionary biology disregards other means of inheritance, and the development of Darwin's theory of sex differences. The last three chapters look at humans, discussing: an interdisciplinary approach to the evolution of sex differences in body height, biological versus social constructive perspectives on the gendering of voices and nature-culture arguments in the current political debate on paternity leave in Norway.

Molecular Genetics of Sex Determination Stephen S. Wachtel 2014-07-23 In this era of accelerated discovery and prolific output, Molecular Genetics of Sex Determination keeps readers abreast of this field's fast-moving biology. Its chapters were completed by experts in each area only months before publication. The text is organized into two parts. First, it reviews the basic biology of sex determination and summarizes ground-breaking work in mouse, marsupial, and Drosophila systems. Second, it covers current human genetics, clinical studies, and the syndromes of abnormal sex differentiation. With chapters by preeminent reproductive biologists, this is a capital work. Ohno's law is described by Ohno; the Lyon hypothesis, by Lyon; Sinclair tells how he cloned the testis-determining gene; and so on. Molecular Genetics of Sex Determination is authoritative, comprehensive, and current. It is prime reading for geneticists, developmental biologists, graduate students in these and related fields, clinical researchers, physicians, and medical students. Reviews the genetics of sex determination in 19 up-to-date chapters Features research on sex chromosomes and sex-determining genes Includes abnormalities of sex determination and clinical genetics Written by scientists who pioneered work in this field

XY Matt Whyman 2002 Top agony uncle Matt Whyman provides frank information on subjects of vital interest to teenage boys: puberty and private parts, sex and smoking, girls, mates and home life. He answers all the questions they're dying to ask, but daren't - and tells it straight: 'Nowadays it can seem as if everyone is down on boys. XY doesn't go there. You won't find any kind of judgement about who you are, or any attempt to spin you some kind of agenda. It just serves up clear and balanced info about issues central to your life, and leaves the smart moves up to you.' For ages 12-15.

Sex Determination in Vertebrates 2019-04-16 Sex Determination, Volume 134, the latest release in the Current Topics in Developmental Biology series, contains current reviews in the field of vertebrate sex determination. It covers molecular pathways of sex determination in genetic and environmental species and encompasses both sex determination of somatic lineages and commitment of germ cells to male or female fate. Chapters in this new release cover, amongst other topics, Mapping the Sox9 Enhancer Elements, Epigenetic Regulation of Sex Determination, Evolution and Management of Sex Chromosomes, Regulation of Germ Cell Sex Identity in Medaka, Control of Sex Determination in Zebrafish, Sexually Dimorphic Germ Cell Identity in Mammals, and more. Contains reviews written by leading experts in each field Includes informative figures that illustrate

principle points that are useful for teaching Written in a style that is clear and simple

Understanding Genetics Genetic Alliance 2009 The purpose of this manual is to provide an educational genetics resource for individuals, families, and health professionals in the New York - Mid-Atlantic region and increase awareness of specialty care in genetics. The manual begins with a basic introduction to genetics concepts, followed by a description of the different types and applications of genetic tests. It also provides information about diagnosis of genetic disease, family history, newborn screening, and genetic counseling. Resources are included to assist in patient care, patient and professional education, and identification of specialty genetics services within the New York - Mid-Atlantic region. At the end of each section, a list of references is provided for additional information. Appendices can be copied for reference and offered to patients. These take-home resources are critical to helping both providers and patients understand some of the basic concepts and applications of genetics and genomics.

Evolutionary Studies of Sex Chromosome Linked Genes and Male-biased Mutation in Birds Anna-Karin Fridolfsson 1999

Sex Chromosomes and Sex-Linked Genes Susumu Ohno 2013-06-29 Natural selection operates among individual organisms which differ in their genetic constitution. The degree of hereditary variability within a species is greatly enhanced by cross-fertilization. Indeed, the mechanism of sexual reproduction occurred very early in evolution, for it is seen today even in bacteria. In *Escherichia coli*, fertilization occurs by passage of the single chromosome from the male into the female bacterium (LEDERBERG, 1959). In multicellular organisms, the separation of germ from soma, and the production of haploid gametes became mandatory. The gametes were of two types. One, extremely mobile, was designed to seek out and penetrate the other, which loaded with nutrients, received the mobile gamete and initiated the development of a new individual. The foundation for true bisexuality was thus laid. In the primitive state of bisexuality, whether an individual is to be a sperm-producing male or an egg-producing female appears to be decided rather haphazardly. In the worm, *Banelia viridis*, the minute males are parasites in the female. Larvae that become attached to the proboscis of an adult female become males, while unattached larvae sink to the bottom and become females (BALTZER, 1935). The more sophisticated state of bisexuality was initiated by setting aside a particular pair of chromosomes for specialization and making either the male or the female a heterogametic sex. Sex chromosomes as we know them were thus born.

Genetic Sex Differentiation in Fish T. J. Pandian 2012-06-05 A comprehensive study of sex differentiation gonochoric and hermaphroditic fishes, this book examines sex chromosomes and sex determining genes, emphasizing the need to search for more than one sex-determining gene residing on different chromosomes. It traces the origin of hermaphrodites from secondary gonochores and explains the conservation of homologous sex differentiation and steroid receptor genes among gonochores and hermaphrodites. The author identifies the optimal broodstock size and the appropriate candidate species for bait. He shows that the analysis of steriles and mutants has demonstrated the value of fishes as a system for genetic dissection of human development and diseases.

The Behavior of the Human Male Sex Chromosomes in Early Meiosis Charlotte Louise Kirk 1974

Sex Chromosome Evolution of Papaya Jennifer Han (Ph. D.) 2014 Sex chromosomes are found throughout many diverse lineages across the animal and plant kingdom. Most of the sex chromosomes that have been studied are well established and have already experienced many evolutionary forces, making it difficult to reconstruct the dynamic changes involved in the evolution of sex chromosomes. Sex chromosomes are evolved from a pair of autosomes with closely linked sex determining genes that have stopped recombining. Papaya has many qualities that make it attractive for studying sex chromosome genetics. It is trioecious (male, female, and hermaphrodite) with sex determined by a pair of nascent sex chromosomes approximately 7 million years old. The genome is relatively small (442.5 Mb) and the sex determining region of the sex chromosomes is small and well characterized; the hermaphrodite and male specific region of the Yh and Y chromosome respectively is 8.1 Mb and the corresponding X is 3.5 Mb. These sex specific regions of the X and Y chromosomes not only contain the genes that control sex type, but they also have genes associated with the different sexes. While the vegetative forms of the three sexes are phenotypically identical, the reproductive structures are unique. In stark contrast to female and hermaphrodite flowers on male plants are borne on long pendulous peduncles (60-90 cm) at the leaf axis. Female and hermaphrodite flowers are borne on short peduncles (0-4 cm). Gynodioecious varieties SunUp, SunUp Diminutive mutant and dioecious AU9 were used to test the response of papaya to gibberellic acid (GA3). Gibberellic acid is a hormone known to cause elongation of stems throughout the plant kingdom. It is also known as a masculinizing hormone. Exogenous applications of GA3 on female and hermaphrodite papaya did not yield any sex reversals but there was a significant increase in peduncle length and inflorescence branch number in all treated plants. There was an increase in plant height for all treated plants except SunUp Diminutive mutant, suggesting that the mechanism causing the dwarf phenotype is independent of gibberellins. Gibberellin metabolism genes were identified in the papaya genome, none of which mapped to the sex-determining region of either the male- or hermaphrodite-specific region of papaya Y or Yh chromosome. We hypothesize that a trans-acting regulatory element that enhances gibberellin biosynthesis plays a role in the extreme length of the male papaya peduncle Sex chromosomes experience several evolutionary forces. To further study the structure of the sex chromosomes, a mapping population was created to generate a high density genetic map. A female AU9 was crossed with a hermaphrodite SunUp, the resulting offspring was backcrossed to the hermaphrodite SunUp. Fifty-one individuals derived from this cross were used to create restriction-site associated DNA sequencing (RAD-seq) libraries. A total of 228 RAD-seq markers were mapped to 9 major and 2 minor linkage groups. Previous studies have shown that the Y chromosome experiences severe recombination suppression along the sex determining region. The resulting map from this study showed that the X chromosome is not experiencing recombination suppression. Additionally, possible centromere locations were identified for the other chromosomes. Sex chromosomes also undergo degeneration of genetic material. The effective population size of the sex chromosomes is reduced compared to the autosome. The lack of recombination, especially for the Y chromosome also increases the rate of degeneration. RNA seq data was generated using flower and leaf tissue from females, males, and hermaphrodite individuals to determine the rate at which the Y chromosome is experiencing degeneration. Expression levels were compared between the X and Y linked alleles in males and hermaphrodites. If there is no Y degeneration, then the expression levels between the sex linked alleles should be equal. Expression of male leaf tissue had significantly less expression of the Y allele compared to the X allele. This was not found in hermaphrodites and in all flower tissue. Dosage compensation is a phenomenon utilized by many organisms with sex chromosomes to account for the heterogametic sex having only one allele for many of the genes on the sex chromosome. While many organisms compensate expression levels in the heterogametic sex, this is not true of all animals. Very few studies have been conducted to determine if plants undergo the same evolutionary forces as animals and also evolve dosage compensation. There was no detectable dosage compensation in the primitive papaya sex chromosome.

Gender Differences: Their Ontogeny and Significance Christopher Ounsted 1972

Sex Determination Guido Bacci 1965

The Evolution of Sex Determination Leo W. Beukeboom 2014 temperature) or social variables (e.g.

Sex Chromosomes Ursula Mittwoch 2014-06-28 Sex Chromosomes focuses on the study of sex chromosomes, including human chromosomal abnormalities, behavior and characteristics of chromosomes, and cell division. The book first offers information on the chromosomal basis of sex determination, as well as development of the cell theory, mitosis, fertilization, meiosis, and discovery of sex chromosomes. The publication also ponders on the mitosis, meiosis, and formation of gametes. Discussions focus on the special characteristics of sex chromosomes, abnormalities of cell division, and sexual differentiation. The manuscript reviews sex chromosomes in plants, *Drosophila*, and *Lepidoptera*. The book also examines sex-chromosome mechanisms that differ the classic type; sex chromosomes in fishes, amphibia, reptiles, and birds; and sex chromosomes in man. Discussions focus on normal human sex chromosomes, Turner's syndrome, Klinefelter's syndrome, true hermaphrodites, testicular feminization, and pseudohermaphrodites. Sex chromosomes in mammals other than man, including monotremata, marsupialia, insectivora, rodentia, and carnivora, are discussed. The publication is a dependable reference for readers interested in the study of sex chromosomes.

Sex Chromosomes: Advances in Research and Application: 2011 Edition 2012-01-09 Sex Chromosomes: Advances in Research and Application: 2011 Edition is a ScholarlyBrief™ that delivers timely, authoritative, comprehensive, and specialized information about Sex Chromosomes in a concise format. The editors have built Sex Chromosomes: Advances in Research and Application: 2011 Edition on the vast information databases of

ScholarlyNews.™ You can expect the information about Sex Chromosomes in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Sex Chromosomes: Advances in Research and Application: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

Evolutionary Mechanisms in Sex Determination Stephen S. Wachtel 1989 Based on the International Conference on Developmental Biology, "Evolutionary Mechanisms in Sex Determination," held in Memphis, May 4-8, 1987.

MALE WITH XXXXY SEX CHROMOSOMES. 1962

Women with Male Sex Chromosomes William H. Sternberg 1971

Spectrum of Sex Minoru Tanaka 2022-11-07 This book introduces cutting-edge studies on the spectrum of sex. The sex spectrum can be understood as an interwoven mechanism sustaining graded phenotypes between the two sexes. The book overviews three elements that develop the sex spectrum: genetics, the endocrine system, and the environment. Part I discusses the genetic regulation during sex determination, which often results in a mixture of two sexes or sex reversal. The evolutionary aspects of the genetic determinants are also discussed. Part II presents the involvement of endocrine regulation in the sex spectrum, which covers a broad range of phenotypic events, including sexual behavior and metabolism. Interestingly, sex hormones can also act as sex determinants. Finally, Part III shows that intrinsic factors, such as sex-determining genes and sex hormones, are not the only factors in sex development. The environment surrounding organisms, such as symbiosis and metabolism, act on the sex as critical factors, generating the sex spectrum. Determination and development of the two sexes have been a topic of great interest and a long-standing issue in biology. The book updates the conventional view that biological sex is fixed after birth and sets new perspectives for understanding sex as a spectrum manifested in multiple phenomena. Each chapter contributed by leading experts explains the sex spectrum in various organisms and their underlying mechanisms from the latest ongoing studies. The book provides a valuable resource for not only experts in developmental biology, physiology, and medical science, but also non-scientists and anyone interested in the topic.

Splitting the Sexes Aivars Cirulis 2022 The evolution of gonochorism from hermaphroditism can be gradual by increasing investment in one sex role while decreasing in the other, or rapid through the fixation of sex-role sterility mutations, eventually leading to the evolution of sex chromosomes. It is expected that the transition will involve a temporary state of gynodioecy or androdioecy as the mutations are not expected to take place at the same time. If the first mutation is a dominant female-sterility mutation, later accompanied by a recessive male sterility mutation, then an XY sex chromosome system evolves, while the opposite combination of mutations will result in a ZW system. Later on sexually antagonistic (SA) genes can be linked to the newly established sex-determining regions on the sex chromosomes. This is followed by recombination arrest in the region, so that the inheritance pattern is sex-limited for all these sex-specific genes. However, the lack of recombination leads to degeneration of the genetic content on the sexlimited chromosomes, since recombination is important for repairing mutations. Nevertheless, recombination arrest does not necessarily mean a dead-end for the sex-limited chromosomes. As our understanding of the very early stages of sex chromosome evolution is mainly based on theory and comparative evidence, we developed a system which we hoped would make it possible to observe in real time what happens after the acquisition of a new sex-determining gene. We used a previously established green fluorescent protein (GFP) line of the simultaneous hermaphrodite *Macrostomum lignano*. We used the GFP locus as a dominant sterility mutation, which is inherited in a Mendelian fashion. By allowing the GFP allele to be inherited only through sperm, we created male-limited selection lines (resembling the early stages in XY chromosome evolution), and by allowing the GFP allele to be inherited only through egg cells, we created female-limited selection lines (resembling the early stages in ZW chromosome evolution). We also created control lines, where the inheritance pattern was equally mixed. After tens of generations, we investigated how these lines have responded on the level of the genome, the transcriptome, and the phenotype. We sequenced genomes and analysed changes in SNP frequency and structural variant (SV) distribution in pairwise comparisons to see changes across the genome, but particularly on the scaffold where the GFP is located. We also sequenced transcriptomes and performed pairwise comparisons to detect differentially expressed genes, and analysed significant GO terms and KEGG pathways to see how the gene regulation has changed. Besides genomic analyses, we also looked at how mating behaviour (copulation frequency and duration, as well as probability of post-copulatory sucking behaviour) and sexual anatomy (gonad size and morphology of the male copulatory organ called stylet) has changed. We observed that the female-selected lines seemed to have responded the most at the genomic level. For example, the number of significantly differentially expressed transcripts was largest between the female-selected lines and the control lines. These changes seemed to involve downregulation of testes-biased genes. In addition, we observed the highest number of SVs in the female-selected lines, which could be related to changes in recombination rate. In contrast, the male-selected lines seemed to have responded the most at the phenotypic level, since we observed a decrease in the ovary size and body size in the male-selected lines, as well as behavioural changes that may be related to changes in the ejaculate. Both sex-specific selection regimes showed evidence of alterations in the shape of the stylet. Based on these results, we can conclude that our worms have indeed responded to the sex-limited selection in a way that is generally consistent with our expectations from other young sex chromosome systems. The evidence of a decrease in the testes function in the female-selected lines resembles adaptation towards gynodioecy, and the evidence of a decrease in the ovary size in the male-selected lines resembles adaptation towards androdioecy.

Genetics of Sex Determination R.S. Verma 1996-04-23 The Genetical Theory of Natural Selection by R.A. Fisher (1930) dictated that sexual dimorphisms may depend upon a single medelian factor. This could be true for some species but his suggestion could not take off the ground as gender in *Drosophila* is determined by the number of X chromosomes. Technical advances in molecular biology have revived the initial thinking of Fisher and dictate that TDF or SRY genes in humans or Tdy in mice are sex determining genes. The fortuitous findings of XX males and XY female, which are generally termed sex reversal phenomenon, are quite bewildering traits that have caused much amazement concerning the pairing mechanism(s) of the pseudoautosomal regions of human X and Y chromosomes at meiosis. These findings have opened new avenues to explore further the genetic basis of sex determination at the single gene level. The aim of the fourth volume, titled *Genetics of Sex Determination* is to reflect on the latest advances and future investigative directions, encompassing 10 chapters. Commissioned several distinguished scientists, all pre-eminent authorities in each field to shed their thoughts concisely but epitomise their chapters with an extended bibliography. Obviously, during the past 60 years, the meteoric advances are voluminous and to cover every account of genes, chromosomes, and sex in a single volume format would be a herculean task. Therefore, a few specific topics are chosen, which may be of great interest to scientists and clinicians. The seasoned scientists who love to inquire about the role of genes in sex determination should find the original work of these notable contributors very enlightening. This volume is intended for advanced students who want to keep abreast as well as for those who indulge in the search for genes of sex determination.

Behaviour of Heterochromatin and of the Sex Chromosomes During Male Meiosis of Related Rodent Species Maria Teresa Zenzes 1973

Genetics of Sex Differentiation Ursula Mittwoch 2012-12-02 *Genetics of Sex Differentiation* intends to help readers understand the genetic basis of sex differentiation. The book focuses on explaining how the sex chromosomes affect the process of sex differentiation by influencing the rates at which cells divide. The book is composed of seven chapters. It provides overviews of classical genetics and structure of cells. It also explains the chromosomal basis of sex determination and sex determination using *Drosophila*. Polygenetics and continuous and quasicontinuous variations are also discussed. The book also discusses sex factors, determination, and disorders. Moreover, it explains the heterochromatin, embryological basis of sex differentiation, and triploidy and autosomal effects. In addition, it discusses the relationship of genes, chromosomes, growth, and sex. The book is an excellent "bedside book" for students in biology, specifically in genetics and developmental biology. Lecturers and professionals in biology and genetics will also find this book invaluable for their practice.

The X in Sex David. BAINBRIDGE 2009-06-30 A tiny scrap of genetic information determines our sex; it also consigns many of us to a life of disease, directs or disrupts the everyday working of our bodies, and forces women to live as genetic chimeras. The culprit--so necessary and yet the source of

such upheaval--is the X chromosome, and this is its story. An enlightening and entertaining tour of the cultural and natural history of this intriguing member of the genome, *The X in Sex* traces the journey toward our current understanding of the nature of X. From its chance discovery in the nineteenth century to the promise and implications of ongoing research, David Bainbridge shows how the X evolved and where it and its counterpart Y are going, how it helps assign developing human babies their sex--and maybe even their sexuality--and how it affects our lives in infinitely complex and subtle ways. X offers cures for disease, challenges our cultural, ethical, and scientific assumptions about maleness and femaleness, and has even reshaped our views of human evolution and human nature. Table of Contents: Prologue 1. Making a Difference Interlude: What Is It, Exactly? 2. The Duke of Kent's Testicles Interlude: How Sexy Is X? 3. The Double Life of Women Epilogue: The Chosen One Further Reading Glossary Index

Reviews of this book: The author of *Making Babies* takes a lively, witty tour of the X chromosome, creator of "a delicious symmetry between men and women"...Entertaining and informative...A fine demonstration of science made accessible. --Kirkus Reviews

Reviews of this book: A well-written, well-researched, easy-to-read study that explains what has been learned about the X and Y chromosomes using DNA sequencing and other molecular biology techniques. British biologist Bainbridge...has pulled together historical and current scientific research about how the X and Y chromosomes affect us and what the genes on these chromosomes actually do, like causing sex-linked diseases and color blindness...An excellent example of good science writing...Recommended. --Margaret Henderson, *Library Journal*

Reviews of this book: Bainbridge is an essentialist, interested in understanding what aspects of gender are biologically driven, and why...He has a central question he wants to answer. The question is not so much why men and women are different (a worn topic that's the subject of too many Mars-and-Venus bestsellers) but, far more specific and far more interesting: Why are men and women more different than they need to be? --Liza Mundy, *Washington Post*

Reviews of this book: Bainbridge summarizes our knowledge of the genetic information that determines one's sex by recounting the ancients' speculations about the genesis of gender, following with modern biologists' discovery of the X and Y chromosomes about a century ago, and of the sex-determining gene Sry in the 1990s. In a discussion rich with history, evolution, and philosophy, Bainbridge points out the dramatic effect that gender selection has on people's lives...A fascinating, often humorous analysis of the science of sexuality. --Gilbert Taylor, *Booklist*

Reviews of this book: In *The X in Sex*, David Bainbridge explains the far-reaching effects of X. Bainbridge...moves with ease between straightforward accounts of biology and historical stories about its effect, like the chapter describing the progression of hemophilia through the royal houses of Europe. Bainbridge discusses cultural history as well as natural history, and his wit enlivens every page. --Christine Kenneally, *New York Times Book Review*

Reviews of this book: There are many literary stars (such as Stephen Jay Gould, Richard Dawkins and Matt Ridley) in the firmament of writers on evolution, and to a man they write with dash and persuasive logic. David Bainbridge is one such and in his latest book he takes the reader through the glories of the X chromosome at a cracking pace. --Miriam Stoppard, *Times Higher Education Supplement (UK)*

Reviews of this book: The truth is that the behaviours of [chromosomes] X and Y are inextricably linked. Bainbridge explores this link in a compelling tale that takes in how the sex chromosomes became sex chromosomes, and the very different consequences of this for women and men. Along the way we encounter the Duke of Kent's testicles, calico cats and non-identical identical twin girls. His story weaves science, history and the history of science (with a little religion for good measure) in a straightforward, anecdotal fashion that will appeal to scientists and non-scientists alike. --Mark T. Ross, *New Scientist (UK)*

Reviews of this book: In his structure/function analysis of the X chromosome, Bainbridge provides a tongue-in-cheek, yet informative, description of one of the two human sex chromosomes. --R. Adler, *Choice*

Reviews of this book: If you have ever been intrigued by some of the puzzles of genetics--why boys tend to get haemophilia or colour blindness while girls are more likely to have an identical twin or to develop rheumatoid arthritis later in life--then *The X in Sex* is for you. --Chris Tyler-Smith, *Times Literary Supplement*

David Bainbridge takes us on a fascinating tour of X chromosomes and explains what the possession of these intricately folded, infinitesimally narrow, two-inch long strings of genetic codes weighing almost nothing, means for their bearers--that is for each one of us, male and female. History and personal anecdotes are woven together with up-to-date summaries of the science, punctuated with Bainbridge's zany--and very British--humor, so that this information-packed book is pure pleasure to read. --Sarah Blaffer Hrdy author of *Mother Nature: A History of Mothers, Infants, and Natural Selection*

The X in Sex is absolutely fascinating, so intriguing, in fact, that I found myself unwilling to put it down. David Bainbridge surveys an astonishing amount of new information from recent genomic studies of the X chromosome, clearly explaining the findings in a way the average person can easily follow. The science is presented via amusing and highly appropriate metaphors and clever turns of phrase, all of which serve to brighten the prose and present the reader with catchy ways to think about complex ideas. This is an informative, authoritative, and thoroughly enjoyable read: one of the best books I have read in recent years. --Jane Lancaster, University of New Mexico

This is wonderful stuff--beautifully written, clear, jargon-free, with anecdotes sure to hold the attention. --other hupauthorTim Birkhead, author of *Promiscuity: An Evolutionary History of Sperm Competition*

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