ANBI116 Evolution of Sex : Glossary of Terms

**Please focus on the terms in RED for the midterm**

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| **ABO histo-blood group:** System of molecular (glycan) variation whereby individuals make antibodies against the variants that they do not have. The glycan antigens are found on blood cells and secreted molecules in the vasculature and in mucosal secretions. |
| **Abortifacient:** chemical compound that can induce abortions (saffron, nutmeg, pennyroyal). |
| **Adaptive immune system**: Part of the immune system that can “learn” about novel molecules and uses somatic recombination to generate molecular probes (antibodies) to recognize novel molecules. |
| **Adelphophagy:** Eating of sibling in utero such as in some sharks and salamanders. |
| **Allele**: Variant of a stretch of DNA, diploid animals have to alleles at each locus. |
| **Alu element:** short retrotransposons that are specific for the genomes of primates and are found in over 1 million copies! |
| **Aneuploidy:** Presence of excess or lack of one or more chromosome in a genome, e.g. XXY males or XXX females. |
| **Anisogamy:** Production of gametes of different size (small sperm, large eggs) |
| **Anti-Müllerian Hormone (AMH):** hormone involved in regulating male-specific “plumbing” by eliminating the Müllerian ducts (precursors to the fallopian tubes). AMH is also involved in various aspects of female fertility including ovarian reserves. |
| **Assortative Mating:** Mating between individuals that share certain traits |
| **Atresia:** Loss of viable eggs in the ovaries. |
| **Autoimmune disease:** Disease caused by reaction of the immune system against the body. |
| **Autosome:** All chromosomes other than X and Y, i.e. numbers 1 to 22 in humans. |
| **Baculum:** Penis bone, present in several mammals, vestigial in apes and absent in humans. |
| **Birds of Paradise:** Large family of 44 bird species in Indonesia, Papua New Guinea and Australia closely related to corvids, with exceptionally elaborate plumage and or exquisite male dance performances in the context of female mate choice. |
| **Blending Inheritance:** Erroneous notion that heritance factors behave like fluids and blend and dilute like different fluids would when blended. |
| **Blood groups** (e.g. ABO): systems of molecular polymorphisms (individual within the same population differ in molecular composition of their blood cells and can have circulating antibodies against the molecules they lack. |
| **Bower Birds:** a family of 27 bird species in Papua New Guinea that have males construct elaborate creations to increase their mating chances. |
| **Bruce Effect:** Perception of novel male causes pregnant mice to resorb their fetuses. |
| **Cell**: Biological unit consisting of a lipid membrane covered by a glycocalyx and containing DNA and cytoplasm. |
| **Cephalo-pelvic disproportion**: Mismatch between the baby’s head size and a mother’s pelvic canal. |
| **Chromatin**: DNA wrapped around histone proteins. |
| **Chromosome:** Segments of DNA wrapped around histones, each species of animal has a characteristic number of chromosomes (humans have 46, chimpanzees have 48). |
| **Concealed Ovulation:**  Notion that females “hide” their ovulating status by not exhibiting clear exterior signs of ovulation such as swelling of perineum (sexual skin around vulva and anus). |
| **Convergent Evolution**: Independent evolution giving rise to similar morphology or adaptations. |
| **Cryptic Female Choice:**  Female choice of father and or particular sperm, after mating has taken place. Selective loss of pregnancy could also be considered cryptic female choice. |
| **Cultural universals**: Cultural traits that have been observed in all human populations. |
| **Culture**: (from Latin cultivare = to plant/grow) behavior and/or beliefs that are transmitted and shared across individuals. |
| **Darwinian fitness:** relative measure of individual reproductive success within a population:the capacity of a variant to displace others in the population in competition for available resources. |
| **Decidua:** Outermost layer of the endometrium (lining of the uterus) that grows prior to ovulation in anticipation of a potential pregnancy. |
| **Differential reproductive success:** The difference between one individual’s lifetime reproductive success and that of the average individual in the population. |
| **Diploid**: Containing two copies of the genome (all somatic cells). |
| **Domesticated viruses:**  Endogenous viruses that have been coopted for adaptations in the host, e.g. placentation, control of male germ cell apoptosis. |
| **Ecological niche:** The specific environment to which an organism is adapted. |
| **Enhancer (genetic):** DNA sequences located on the same chromosome (cis) away from a gene that can influence the expression level of a gene (over a million such sequences exist in the human genome). |
| **Epididymis:** Organ next to testes where sperm undergo maturation. |
| **Evolutionary arms race**: Rapid co-evolution between totally opposing partners such as pathogens and hosts or partially opposing partners such as males and females. |
| **Extra-Villous Trophoblasts:**  placental (trophoblast) cells of fetal origin that migrate into the body of the mother to modulate maternal immunity and alter her spiral arteries in order to bring more nutrients towards the placenta. |
| **Eye-tracking technology**: video based technology using infrared light allowing to non-invasively track, which area of an image a viewer is focusing on. |
| **Family planning:** Methods for avoiding pregnancies and/or terminating unwanted pregnancies. |
| **G.O.D.:** Generation of Diversity. |
| **Gametes:** specialized sex cells (literally “fuckers”). |
| **Gene**: Functional stretch of DNA. |
| **Generation time**: Average time it takes for an organism to reach sexual maturity and reproduce. |
| **Genetic cause**: Aspect of phenotype caused by inherited DNA mutations |
| **Genetic/ genomic Imprinting:** Chemical modification of DNA or histones that affects gene expression |
| **Genetics**: Study of inheritance, DNA and its functions |
| **Genital Virilization:** Causing female genitals to appear male-like (e.g. spotted hyena, Lemurs etc). |
| **Genome dilution:** The phenomena of only half of each parental genome being inherited by each offspring in sexually reproducing species. |
| **Genome**: The totality of the genetic material in an organism. |
| **Genomic instability**: Loss of stability of a genome as can happen after viral infection or during cancer. |
| **Genotype:** Make-up of an individual’s genome. |
| **Germ line**: Cells of an organism that give rise to gametes (sperm and eggs). |
| **Glycans**: Mono- oligo – or polysaccharides, which unlike proteins glycans can be branched and are not directly encoded in DNA. |
| **Glycocalyx**: “Sugar coat” complex layer of gycoconjugates, glycolipids and gloycoproteins surrounding each living cell and most viruses. |
| **Haploid**: Containing only a single copy of the genome, I.E. only one copy of each chromosome and either an X or a Y chromosome (sperm and egg) |
| **Haplotype**: Unique combination of alleles across neighboring loci |
| **Hemochorial placentation:** A type of invasive placentation that involves direct contact between maternal blood and fetal placental tissue. |
| **Herd immunity:** Phenomenon, whereby populations can resist widespread infection due to the presence of sufficiently high rates of immune individuals. |
| **Heritable variation**: Variation in biology and behavior that is inherited from one or both parents |
| **Hinny:** Offspring of hybrid cross between a female donkey and a male horse. |
| **Histone code:** chemical modification of histones and placement of histones along chromatin affects gene expression. |
| **Histone**: Positively charged proteins that act as “spools” for genomic DNA. |
| **HLA/MHC**: Group of genes encoding important self-identification proteins: these sample the content of a cell and present sampled molecules to T-cells for inspection. These were discovered in the context of pregnancy: thus Human leukocyte antigen (HLA) and xenotransplantation, thus major histocompatibility complex. |
| **Holocene**: The epoch of the last 11 thousand years |
| **Hunter-gatherer**: Human populations that forage for subsistence, collecting wild foods and hunting or fishing |
| **Hydatidiform mole:** highly invasive placenta-like tissue that forms from a developing egg with two sperm nuclei. |
| **Immune Paradox of Pregnancy:** Paradox by which pregnant females tolerate the foreign (allogeneic) fetus. (half of the genome of the fetus comes from another individual: the father). |
| **Immune surveillance**: Processes by which immune cells “patrol the body and detect non-elf molecules as potential danger signs of infection and/or cancer. |
| **Inclusive Fitness:** Fitness via the shared gene variants in other individuals, e.g. a gradnmotr can benefit from helping her grand-children. |
| **Innate immune receptors**: Receptors that can recognize telltale molecules of self and non-self. |
| **Isogamy**: Production of same size gametes. |
| **IUD:** Intra Uterine Device used for contraception, these can also be coated with hormones. |
| **Junk DNA**: DNA without known function, the majority of the DNA in the genome of humans and other animals. Recent research indicates that much of the so-called junk DNA might have certain functions (in gene regulation). |
| **Karyotype**: Characteristic number of chromosomes of a species. |
| **Kleptogamy:** (“theft of mating”) Sneaky f#@&ing |
| **Lamarckism (Lamarckian evolution):** Evolution that includes the inheritance of acquired characteristics |
| **Lipids**: Fats consisting of fatty acids and diverse modifications |
| **Locus**: Site/location on the DNA |
| **Lonterm acting reversible contraceptives (LARC):** IUDs and implants. |
| **Mating effort:**  Effort in time and energy that each individual invests in seeking mating opportunities. |
| **Meiotic Drive:** The phenomenon whereby a particular genetic variant become over-represented during meiosis and gamete formation, the variant “drives” itself into most gametes at the cost of other variants. |
| **Microbe**: Organism that is not visible to the naked eye. |
| **Microbiome**: Complete collection of microbes living in or on an animal. |
| **Milk oligosaccharide**: Modified lactose oligosaccharides that are made by the mammary glands and provide nutrition and protection to the infant. |
| **Model organism:** Species other than humans used to study biological phenomena The most common ones are brewer’s yeast, *C. elegans* worms, *Drosophila* fruit flies, and laboratory mice. |
| **Morphology**: Shape of an animal, or one of its organs |
| **Mother corn:** a fungus that grows on rye kernels and contains powerful alkaloids including ergotamine, which has been traditionally used to control excessive bleeding after childbirth (when the placenta detaches). |
| **Mule:** Offspring of hybrid cross between a female horse and a male donkey. |
| **Muller’s Ratchet:** The accumulation of deleterious mutation in the absence of sexual recombination. |
| **Natural Selection:** Process involving differential survival and reproductive success of individuals that pass on heritable variation. |
| **Neolithic**: “New stone” the time period of the last ten thousand years, where humans settled and started farming and/ raising livestock. |
| **Neoteny:** Changes in development whereby juvenile traits are retained in the adult |
| **NET (neutrophil extracellular trap):** Chromatin (DNA and histone proteins) of neutrophil cells that these cells extrude to kill invading microbes or sperm. |
| **Non-paternity** (extra-pair paternity): Offspring born from mating outside an exsiting pair bond/marriage. |
| **Nucleic acids**: The molecules of inheritance, DNA and RNA |
| **Obstetric dilemma**: The need for narrow hips for bipedality and the constraint this exercises on the birth canal for a species with large headed babies. An alternative view sees human birth mostly limited by maternal metabolism, rather than by narrow pelvic passage, but both could easily be true. |
| **Ochre:** an iron-rich natural clay earth pigment, mixture of ferric oxide and varying amounts of clay and sand. It can been used for body painting and decoration of hair, it is crushed into powder and can be mixed with fats (plant or animal) to form a deep reddish brown to yellow paste, depending on the origin and precise composition of the ochre. Ochre is widely used for painting buildings as well. |
| **Oocytic Atresia:** Destruction of oocytes trough apoptosis. |
| **Oophagy:** Eating of eggs by the fetus, also preying on eggs of other species. |
| **Operational sex ratio:** sex ratio (M:F) only considering fertile individuals, adult males and female capable of conceiving. |
| **Organism**: Living entity that can reproduce and evolve. |
| **Ovoviviparity**: retention of eggs with development of the offspring prior to birth. |
| **Oxytocin receptors:** Cell surface protein that are selectively bound by oxytocin hormone and signal to cells (often neurons). |
| **Oxytocin:** Small peptide hormone with strong effects of social behavior, trust, emotional attachment and discrimination against out-groups. |
| **Parasite**: Organism that benefits by harming its host, often used for larger organism including protozoans and worms In contrast to viruses and bacteria. |
| **Parent-Offspring conflict:** Evolutionary conflict between interests of the parents and the offspring, e.g. individual infants might want to suckle breastmilk for longer than is optimal for a mother across all her offspring. |
| **Parental effort:** Effort in time and energy that each parent invests in his/her offspring. |
| **Pathogen**: Organism that causes disease in the host |
| **Phenotype:** Physical appearance of an individual (including molecules and behavior). |
| **Phylogenetic tree**: Graphic depiction of lineages (past populations) of organisms. |
| **Phylogeny**: The history of lineages or organisms |
| **Placenta:** Specialized tissue of the fetus that invades the mother’s uterus and feeds the fetus. |
| **Polyandry:**  A mating system, where female regularly mate with more than one male. |
| **Polygynandry:** Mating between multiple males and multiple females |
| **Polymorphism:** natural variation existing within natural population where the variants are at least at a frequency of 1%. |
| **Population bottleneck**: Strong decline in population number lasting one or more generation (can be due to major die-off or founder event). |
| **Pornography:** (literally images of prostitutes) portrayal of sexual content for the exclusive purpose of sexual arousal. There are many contradictory definitions, among them: “I know it when I see it”. |
| **Primary sex ratio:** sex ratio (M:F) at conception/fertilization |
| **Protein coding gene**: A stretch of DNA encoding a peptide or protein |
| **Proteins**: “Building blocks of life” proteins consist of chains of connected amino acids and are directly encoded by genes in the DNA of organisms. Short proteins are called peptides. Most proteins fold and form complex 3-D structures. |
| **Protozoan**: One-celled eukaryotic animal that cannot photosynthesize. |
| **Pseudo Swelling:**  Swelling in the hind parts of male monkeys that mi8mics the sexual swelling in ovulating females. |
| **Reciprocal Exogamy:** Mating system where individuals belonging to different social groups form mating couples. |
| **Red Queen Effect**: Notion that hosts have to run just to stay in one place due to the rapidity of the evolution of their parasites. |
| **Retrotransposons:** largest class of transposons, genetic elements that multiply via RNA copies and retro-transcription into DNA. |
| **RNA gene**: Stretch of DNA encoding RNA with a function other than coding for protein. |
| **Sapiosexuality:** sexual attraction to people with knowledge… |
| **Secondary sex ratio:** sex ratio (M:F) at birth. |
| **Sex chromosome:** X and Y chromosomes |
| **Sex determination:** Mechanisms that determines the sex of individuals, molecular (e.g. sex chromosome) or environmental (e.g. temperature). |
| **Sex-specific genomic imprinting:** Modification of DNA or histones that affects gene expression in a parent of origin patterns (paternal imprinting in DNA of sperm differs from maternal imprinting in ova). |
| **Sexual conflicts:** Conflicts involving differential interests of individuals or groups linked to sexual behavior and reproduction, these take place at many differential spatial scales, from nanometer (DNA) to kilometers (societies). |
| **Sexual Dimorphism:** Difference in between the sexes of the same species. |
| **Sexual recombination**: Shuffling and halving of the two parental genomes during the production of sperm and eggs. |
| **Sexual Selection**: Evolutionary mechanism whereby individual reproductive success is enhanced by features that appeal to the opposite sex (mate choice) or increase an individual’s fertility in any other way. |
| **Sexually transmitted infection**: Infections passed on during sexual behavior, they can be non-symptomatic but still be infectious (thus STI rather than STD)! |
| **Sing-sing:** traditional peaceful gatherings between tribes in Papua New Guinea and Iryan Jaya, where human males dance and sing in full regalia, body paints, head dresses including bird of paradise feathers etc. |
| **Social Monogamy:** Social (but not necessarily reproductive) pairingbetween mates |
| **Soma**: “Body” the cells that make the body of a sexually reproducing organism. |
| **Somatogamy:** Mating without special sex cells (gametes). |
| **Species recognition:** biological variation that can be perceived to identify mating partners of the same species (visual as in reef fish coloration, olfactory as in bush baby hormones, auditory as in songbirds, molecular as in mammalian immune compatibility). |
| **Spontaneous decidualization**: process by which the decidua spontaneously starts growing, irrespective of mating and or pregnancy. |
| **Spontaneous ovulation:**  Ovulation regulated by intrinsic mechanisms in the female (pituitary gland) rather than by external stimuli, e.g. copulation in many Lemur species. |
| **SRY:** Sex determining region Y, testes determining factor Y, a gene located on the Y chromosome that encodes a transcription factor protein which acts as master switch for starting male-specific development in mammals. |
| **Syncytins**: proteins encoded by genes of viral origin, that evolved to be coopted for placentation in many mammals. |
| **Syncytiotrophoblast:** Outer most layer of the placenta, consisting of a layer of cells that have multiple nuclei (syncytia). |
| **Tako tsubo** (cardiomyopathy): broken heart syndrome, a physiological and anatomical change in some persons who have suffered stress caused by acute rejection. |
| **Transcription Factor:** A protein that can bind DNA or other proteins that bind DNA resulting in regulation of gene expression. Other factors such as temperature, pressure, nutrient levels and even conversations and feeling might also be considered to be transcription factors! |
| **Transcription:** Process by which DNA is “read” and RNA is produced from it. |
| **Translation:** Process by which messenger RNA is translated into polypeptides/proteins. |
| **Transposon**: Transposable elements (“jumping gene” “selfish DNA”) a stretch of DNA that replicates independently of genomic replication, increasing its copy number throughout the genome. |
| **Transposons:** “jumping genes”, segments of DNA that can make new copies of themselves irrespective of cell division. |
| **Trophoblast:** Layer of tissue on the outside of a mammalian blastula, supplying the embryo with nourishment and later forming the major part of the placenta. |
| **Two-fold cost of sex**: Notion that obligate sexual reproduction requires males and females, allowing a sexually reproducing population to grow only half as fast as an asexually (clonally) reproducing population. |
| **Variance (statistics):** Variance is a measure of dispersion, meaning it is a measure of how far a set of numbers is spread out from their average value. |
| **Venus figurine:** earliest representative art made by humans, the oldest being almost 40 thousand years old. They are found all over Eurasia and almost certainly had several different symbolic values. |
| **Vestment:** Large coating surrounding the egg consisting of cumulus cells and gel-like, extra-cellular matrix consisting of hyaluronan, a gel forming polysaccharide. |
| **Viral sex**: Notion that viruses can recombine their DNA or RNA when more than one virus infects the same host cell. This generates recombinant viruses that can exhibit novel virulence. |
| **Virus**: Organism that cannot replicate without hijacking the services of a living cell. |
| **Viviparity:** giving birth to developed offspring. |
| **Viviparity:** Live-bearing of offspring, giving birth to live young rather than eggs. |
| **Waist to Hip ratio (WHR)**: Ratio of the circumference of the waist  to that of the hips. |
| **Westermarck effect**: The usually negative impact of shared early childhood on marriage and sexual relationship later in life. |
| **Yin, Yang**: (and oftenYuan): A traditional Chinese philosophical concept of “light-dark”, “negative-positive”, “female-male”, “receptive-active”…opposite forces are complimentary and each contain some essence of each other. In ancient Taosim the duality of Yin and Yang is considered to be an indivisible whole. |
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