Recessive genetic examples

Some examples of dominant and recessive traits in some domestic animals: Genetics of domestic animals - Charles E. Stufflebeam Species Dominant Red Hair Hair Black Hair Coat Polled Horns White Face Solid Color Irregular White spotting Red Yellow Cloven Hooves Mule feet Chickens Rose Comb Single Comb White Skin Dominant White Color Feathers Chestnut or Sorrel Bay Nonbay (Black) Chestnut mane and tail Flaxen mane and tail Smooth Hair Curly Hair Hairy Fleece Wool Fleece White Wool Black Wool Brown Eyes Blue Eyes Swine Black Hair (Hampshires) Red Hair White Belt No Belt Erect Ears Drooping Ears Mule Foot Cloven Hoof Dogs Wire Hair Smooth Hair Smooth Hair Black Hair Liver Color Red Hair Yellow Hair Solid Color White Spotting Cats Short Hair Long Hair Black Hair Brown Hair Agouti (wild color) Nonagouti Color White House A recessive gene is a gene whose effects are masked in the presence of a dominant gene. Every organism that has DNA packed into chromosomes has two alleles, or forms of a gene, for each gene: one inherited from their mother, and the other inherited from their father. A recessive gene is only expressed when an organism has two recessive alleles for this gene. It is also called recessive homozygous. If an organism has a dominant allele and a recessive allele, it will show the dominant trait. Gregor Mendel, an Austrian monk who lived in the 19th century, is considered the father of genetics for his experiments on pea plants. In one experiment, he crossed a purple-flowering pea plant with a white-flowered pea plant, and all the offspring were purple. Then, when he crossed the purple offspring with each other, 75 percent of their offspring had purple flowers and 25 percent had white flowers. This experience shows the principle behind the simple dominant and recessive heritage, which came to be known as the Mendelian heritage. The white flower color was recessive, and the purple flower color was dominant. In genetics, alleles are represented by letters. For example, we may have the capital P represent the purple allele, and the lower letter p represent the white allele. The dominant alleles are always represented by capital letters, and the recessive alleles are always represented by tiny letters. Different alleles for the same gene are represented by the same letter. In Mendel's experiment, the purple pea plant with which he started was PP, and the white pea plant he started with was pp. Their descendants were all pp. They inherited an allele from parent, so they had an allele for purple and one for white. Then, when pp x pp offspring were crossed, approximately 1/4 of the offspring were PP, 2/4 were Pp, and 1/4 were pp. Like three-and-a-fourth of the descending descendants A dominant allele P, 3/4 were purple. Only 1/4 were pp, so 1/4 were white. Even though a total of 3/4 of the offspring had recessive p allele, the white flower line was hidden in 2/4 of the offspring, masked by the dominant P allele. Recessive genes are only expressed if the two alleles of an organism for this gene are recessive. Alleles that an organism possesses are collectively known as genotypes, while their physical appearance and traits are their phenotype. The pea plants pp and pp had different genotypes, but they both had the purple phenotype. Organisms with two copies of the same allele for a gene, for example pp or pp pea plants, are said to be homozygotes for this gene. Organisms that have a dominant allele and a recessive allele, such as p pea plants, are called heterozygotes. Many traits are controlled by a single gene and are dominant or recessive. The dimples, freckles, chin slits and the peak of a widow are all dominant features, so not having these features is recessive. A person will not have these traits if he has two recessive alleles. Other traits expressed because of recessive genes include attached ear lobes, inability to roll his tongue, and round eyes (against almond-shaped). Specific recessive genes are more often mentioned in the context of disorders. Some disorders, such as Tay-Sachs disease, sickle cell anemia and phenylketonuria (PCU) are caused by recessive genes in autosomic chromosomes (chromosomes that are not sex chromosomes). Tay-Sachs is a disorder that leads to the destruction of nerve cells, and there is no known cure for it; people with the disease often die at the age of four. Sickle anemia is a disorder that causes sickle-shaped red blood cells that cannot carry oxygen efficiently; It can result in pain, anemia, and bacterial infections, and can be controlled with folic acid, penicillin, and blood transfusions. PKU causes too much phenylalanine to accumulate in the body, and can cause intellectual disability. In addition, some disorders are caused by recessive genes on the X chromosome and are more likely to affect males, since males have only one X chromosome and therefore do not have a dominant copy of the allele. Recessive X-related disorders include red-green color blindness, hemophilia, a disorder that makes it harder for blood to clot and close wounds during injuries, and Duchenne muscular dystrophy, which causes muscle degeneration. Inbreeding, that is, when organizations produce offspring, may result in an increase in the harmful recessive genes expressed. This is because closely related individuals are more likely to have the same recessive genes. When descendants of a population are less healthy and less likely to survive and reproduce due to recessive genes inherited by inbreeding, this is called inbreeding depression. An example of the effects of inbreeding seen in Charles II of Spain, who lived during the 17th century. He was the last Habsburg to rule Spain. Inbreeding was widespread among the kings of Spain and other European countries in order to preserve the royal blood; for example, first cousins would marry, or uncles would marry nieces. Charles II was the result of generations of inbreeding, and had physical and mental disabilities. He never produced an heir, and was most likely powerless. It is a diagram of The Family Tree of Charles II; all his ancestors go back to the same two people, Philip and Johanna of Castile. Another example of an unusual feature that came in inbreeding could be seen in the Fugate family, whose members lived in rural Kentucky in the 19th and 20th centuries. In the remote area where they lived, many families married, and in this small genetic pool, some inbreeding occurred. As a result, many descendants of Fugates were born with methemoglobinemia, a recessive disorder that causes blue-tinted skin. Gene - Part of an organism's DNA that is transmitted by its parents and codes for a specific function. Allele - A form of gene; it can be dominant or recessive. Dominant gene - Gene that will show its effects even if an organism also has a copy of a different allele (the recessive allele). Inbreeding - Reproduction between two organisms closely related to each other. 1. What disorder is caused by an autosomal recessive gene? A. Red-green Daltonism B. Hemophilia C. Phenylketonuria D. Duchenne muscular dystrophy C is correct. Phenylketonuria, or PCU, is a disorder caused by a recessive gene on an autosomal chromosome. Duchenne's color blindness, hemophilia and muscular dystrophy are all caused by recessive genes on the X chromosome, which is a sex and non-autosomal chromosome. 2. What is inbred depression? A. A type of hereditary depression caused by inbreeding. B. The taboo against inbreeding that exists in most cultures. C. The reduced probability of inbreeding in large populations. D. Population organisms are less likely to survive and reproduce because of inbreeding. D is correct. When inbreeding occurs, the resulting offspring are less likely to survive and reproduce, and at the population level, this is called inbreeding depression. 3. That F represents the dominant allele for freckles, and f represent the recessive allele. If a person does not have freckles, what is their genotype? A. FF B. Ff C. ff D. Choice A or B C is correct. Having freckles is a dominant trait, and not freckles is a recessive trait. Only a person with genotype ff will show the phenotype of not having freckles. Since ff and ff individuals have at least one copy of the dominant F allele, they will have freckles. A recessive trait is a trait that is expressed when an organism has two recessive alleles, or forms of one Characters are characteristics of organisms that can be observed; this includes physical characteristics such as hair and eye color, as well as features that may not be easily apparent, such as the shape of blood cells. Each organism that organizes its DNA into chromosomes has two alleles for one trait, one from their mother and the other from their father. Alleles can be dominant or recessive. Dominant alleles mask the effects of recessive alleles, so that a recessive trait is expressed only when an organism has two recessive alleles for a gene. Gregor Mendel was an Austrian monk who researched pea plants in the 19th century. He found that when he crossed purple pea plants with white-flowered pea plants, all their descendants were purple. When he then went through this new purple generation with each other, 75% of the offspring were purple and 25% were white. Where does the white color come from, and why did it jump a generation? In this case, white is a recessive trait. The allele for the white color was in the first generation of offspring, but it was masked by the dominant purple allele. Then, when this generation grew, some descendants received both recessive alleles, and were white accordingly. When a trait is controlled by a gene that has dominant and recessive alleles, this is called the simple Mendel inheritance. The alleles of strokes are represented by any pair of capital letters or tiny letters, the dominant allele being the capital and the recessive allele being tiny. For example, we could designate P as representing the purple allele in pea and p plants representing the white allele. Individual pea plants are PP, Pp, or pp for flower color trait. PP and pp individuals are purple, while pp individuals are white. The alleles of an organism constitutes its genotype, while the physical appearance of the organism resulting from its alleles is called its phenotype. Only pea pp plants would show the white phenotype, for example. PP and pp individuals are called homozygotic because their two alleles are of the same shape, with PP individuals having two dominant alleles and pp individuals having two recessive alleles. Pp individuals, like this first generation of purple pea plants bred from purple and white pea plants, are called heterozygous because they have two different forms of alleles for a gene. These individuals show the dominant trait because the dominant allele masks the recessive allele. This diagram, called Punnett Square, shows what happened when Mendel crossed his purple pea plants. Since parents had alleles for dominant and recessive traits, approximately a quarter of their offspring showed recessive white flower trait. Many of the traits we see in the people around us are examples of dominant and recessive traits. For example, having a straight hairline is recessive, while having a widow's peak (one hair near the forehead) is dominant. Similar examples include split chins, dimples and freckles; people with recessive alleles for a split chin, dimples, or freckles do not have these features. Having round eyes (as opposed to almond eyes) is recessive, with the inability to roll one's tongue. The attached earlobes (as opposed to freedom) are also a recessive trait. Having blue eyes is recessive for brown eyes, but eye color is an example of a polygenic trait, a trait that is affected by more than one gene, so it cannot be explained by simple Mendelian inheritance. (The color of the eyes being polygenic is the reason why green and hazel eyes exist; a person with green or hazel eyes has some genes for brown eyes and some for blue eyes.) Some disorders are autosomic recessive, such as cystic fibrosis, Tay-Sachs disease and sickle cell anemia. Autosomal means that they are caused by a recessive gene found in one of the chromosomes that is not a sex chromosome (i.e., not found on chromosomes X or Y). Some other disorders are recessive related to X. They are found on the X chromosome and are more common in males, since males have only one X chromosome. Duchenne's color blindness, hemophilia and muscular dystrophy are examples of recessive X-related disorders. There are also many examples of recessive traits in non-human animals. In dogs, features such as yellow fur, white spots and smooth hair are recessive. In cats, white fur, brown fur (as opposed to black fur) and long hair are recessive features. In sheep, black wool and blue eyes are recessive. In pigs, drooping ears and studded hooves are recessive features. In order to raise animals with certain traits, people who raise animals must understand the dominant and recessive traits and use selective breeding to select for the traits they want in these animals. They should also be careful to avoid inbreeding, which occurs when closely related individuals mate. Inbreeding can cause harmful effects because close-related people are more likely to have the same recessive alleles. Gene - Part of an organism's DNA that is transmitted by its parents and codes for a specific function. Allele - A form of gene; it can be dominant or recessive. Dominant trait - Trait caused by two dominant alleles or a dominant allele and a recessive allele. Chromosome - Structure that consists of closely coiled DNA and is found in the 1. Say that W represents the allele to have the peak of a widow, while w represents the allele for having no widow's peak. Having the peak of a widow is dominant. What genotype does an individual with the peak of a widow have? A. WW B. Ww C. ww D. Choices A or B D is correct. People with the untied peak of a widow have at least one dominant allele for this trait. Their genotype for this trait is either WW or Ww, so it could be choice A or B. Not having the peak of a widow, that is, a straight untied, is a recessive trait. These individuals have the ww genotype. 2. What is not a recessive trait? A. Round eye shape B. Inability to roll tongue C. The ear lobes attached D. Freckles D are correct. Having freckles is a dominant trait, while round eyes, tongue rolling inability, and attached ear lobes are all recessive features. 3. Which disorder is recessive related to X? A. Daltonism B. Tay-Sachs Disease C. Cystic Fibrosis D. Sickle cell anemia A is correct. Red-green daltonism is a disorder caused by having two recessive alleles for a certain gene on the X chromosome. Choices B, C and D are also recessive disorders, but they are autosomic disorders, caused by recessive genes on chromosomes that are not sexual chromosomes. Chromosomes.