

Monohybrid crosses in humans

Procedure: For each of the following traits, determine your phenotype and write it in the table on your paper. Based on your phenotype, record your genotype for each of the traits. Remember that if you have a recessive characteristic, you must have both recessive alleles, but if you have a dominant characteristic you may be either homozygous dominant or heterozygous. If you have a dominant phenotype, you may have no way to know if you carry a recessive allele. In this case, use a dash (-) to represent the unknown second gene.

1. **Dimpled chin** A cleft in the chin is a dominant trait. (D allele for dimpling; d allele for absence of a dimple.)
2. **Free ear lobe** In most people the ear lobes hang free (dominant allele, E), but in a person with two recessive genes (e), the ear lobes are attached directly to the head.
3. **Widow's peak** The action of the dominant gene (W) results in a hairline that forms a distinct point, known as a widow's peak, in the center of the forehead. Its recessive allele is the gene w , which produces a continuous hairline.
4. **Ability to taste PTC** Some persons detect a distinct bitter taste in small concentrations of the chemical phenylthiocarbamide (PTC), while others do not taste it. A dominant gene T confers the ability to taste this chemical; those who are homozygous for the recessive allele t are nontasters. Place a PTC paper strip on your tongue and allow it to remain about 10 seconds. If you are a taster you will know it. If you have any doubt about your ability to taste the substance, you are a nontaster.
5. **Interlocking fingers** When the fingers are interlocked, some people will almost invariably place the left thumb on top of the right (dominant gene F). Others will place the right over the left (recessive allele f).
6. **Bent little finger** A dominant gene B causes the last joint of the little finger to bend inward toward the fourth finger (b is the recessive allele for a straight finger). Lay both hands flat on the table, relax your muscles, and note whether you have a bent or a straight little finger.
7. **Hitchhiker's thumb** This characteristic, more precisely called distal hyperextensibility of the thumb, can be determined by bending the last joint of the thumb back as far as possible. While there tends to be some degree of variation, certain individuals can bend it back until there is almost a 90-degree angle between the two joints. This characteristic is an effect of a recessive gene h (dominant allele, H).
8. **Long palmar muscle** A person homozygous for a recessive gene l has a long palmar muscle that can be detected by examination of the tendons running over the inside of the wrists. Clench your fist tightly and flex your hand. Now feel the tendons. If there are three, you have the long palmar muscle. If there are only two tendons (the large middle one will be missing) you do not have this muscle. Examine both wrists – if you find this trait in one or both wrists you have two recessive genes. If not, you have the dominant gene L .
9. **Pigmented irises** When a person is homozygous for the recessive gene p , there is no pigment in the front part of the eyes and a blue layer at the back of the iris shows through, resulting in blue eyes. A dominant allele of this gene, P , causes pigment to be deposited in the front layer of the iris, thus masking the blue to varying degrees. Other genes determine the exact nature and density of this pigment, thus there are brown, hazel, violet, green, and other eye colors. Here, we will concern ourselves only with the presence or absence of such pigment.
10. **Mid-digital hair** Some people have hair on the second (middle joint) of one or more of the fingers, while others do not. The complete absence of hair from all fingers is due to a recessive gene m and the presence of hair is due to a dominant allele M .
11. **Second finger shorter than the fourth** This is a characteristic that appears to be sex-influenced. Use the symbol S^S for a shorter second finger and the symbol S^L for a longer second finger.
12. **Tongue-rolling** The ability to roll the tongue in a U-shape is controlled by a dominant allele (R). Non-rolling is recessive (r).
13. **Freckles** Present (C), absent (c).
14. **Teeth space** Space between two front teeth (T), no space (t).
15. **# of fingers** 6 fingers per hand (S), 5 fingers per hand (s).

Conclusion (why is this useful, did you have any troubles, what did you learn)