

# TinyBear Pomeranians

## Chocolate coats in Pomeranians:

Many people think of chocolate as a 'dilution' gene and therefore equate problems such as CDA – 'Colour Dilution Alopecia', and general fading to the chocolate gene. Dilution isn't an accurate explanation of the chocolate gene.

A chocolate coat is the result of a dog carrying two copies of the 'b' gene recessive – (b/b). Black and chocolate are eumelanin and while eumelanin is being made it is first chocolate and then a reaction occurs to make it black. In the 'b' defect, the last step doesn't occur so instead of becoming black the eumelanin stays chocolate coloured. So rather than diluting colour, the process is actually an incomplete transfer of pigment resulting in a chocolate coat. If full pigment was transferred the coat would be black. This is very different than dilution. A (B/b) dog is black but carries chocolate. Carrying one copy of 'b' does not dilute or wash out a black nose and/or coat. A dog who is (B/B) is no more black than a (B/b) dog. Only one copy of the pair is expressed. The other is hidden but can be passed to offspring.

The "D" gene is the dilution gene which brings a black coat down to blue and a Chocolate coat to Beaver/Isabella/Lavender (the actual colour names differ among the breeds and the breeders). In blue, the black pigment is made but doesn't get transferred properly to the nose and hair. The same is true for Beaver/Isabella/Lavender as the chocolate pigment is made but it doesn't get transferred properly to the nose and hair. It sort of clogs up the pigment-producing cells and causes problems.

Independent of colour and pattern genes, which also affect the coat's phenotype, are genes that 'intensify colour' and 'modify pattern size'. There is no test to identify these genes at this point.

There are different types of the 'B' recessive gene. Per Dr. Sheila Schmutz, there are actually 3 common mutations ( $b^s, b^d, b^c$ ) and perhaps additional rare ones that occur in this gene which result in various shades of brown instead of black eumelanin production. Most of the DNA testing companies simply report all the alleles as 'b'.

So not all Chocolate is the same therefore breeding chocolate to chocolate can result in varying shades. There are no known health concerns or defects associated with chocolate to chocolate breeding. What may happen is too close inbreeding resulting in genetic defects because of the limited number of chocolate dogs available for breeding, in some breeds.

So an exact shade or intensity of chocolate is dependent on multiple genes. Finding the right dogs to bring about your preferred intensity is the job and that could come from other coloured dogs who carry one copy of the 'B' recessive – (b), or it could just as easily come from another chocolate dog.

Until every gene in a dog can be identified by testing, we will have to continue test breedings and some 'coin flipping' in an attempt to get exactly what we