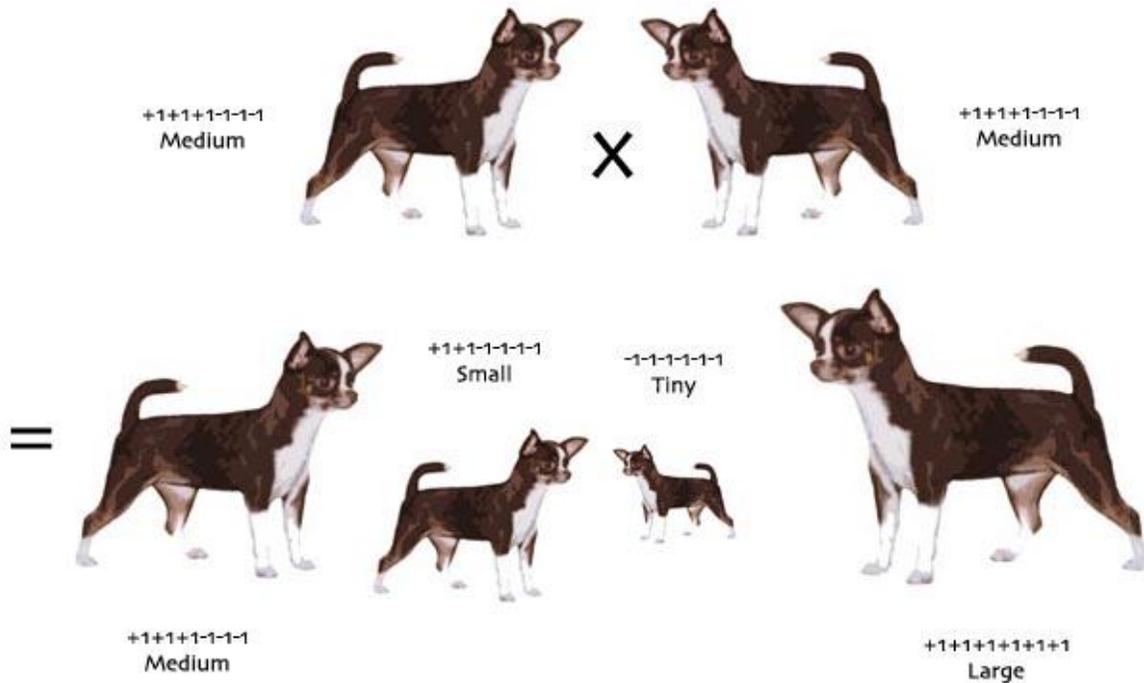


Because of genetics, two medium-sized chihuahuas can have puppies in a wide range of sizes...



*I'm sure at least some of you have wondered at the amazing variation in size when looking at Chihuahuas. How is it that two normal sized or even quite large parents produce a tiny offspring?*

*It's pure genetics.*

*The gene that controls Chihuahua size has six parts, or alleles, and each parent passes on three of theirs to the offspring. Size alleles can be best described as having a value of either + (positive) or - (negative). The six "values" of the alleles are combined for a total, which determines size.*

*For example:  $+, +, +, -, -, -$ , = 6 alleles, or 3 positive and 3 negative. Think of + as "up 1", and - as "down 1." The first three positives cancel out the next three negatives ( $+1+1+1-1-1-1 = 0$ ), so we end up with 0, or your proverbial "average".*

*Another example:  $+, -, +, -, -, -$ . Added together, we get 2 up and 4 down, with an end result of -2, "2 down", or below average size. ( $+1+1-1-1-1-1 = -2$ )*

*One more.  $+, +, +, +, -, -$ . 4 up and 2 down = +2, or "2 up". ( $+1+1+1+1-1-1 = 2$ ) In other words, a bigger than average pup.*

*Are you starting to get the idea? Ok, let's start passing things on to the kids.*

*Take two, average sized parents: Dad =  $+, +, +, -, -, -$  and Mom =  $+, +, +, -, -, -$ . Let's give them a litter of 3.*

*Pup #1: Take (at random) 2 minuses and 1 plus from Dad and 1 minus and 2 pluses from Mom. So, Pup #1 is  $-1, -1, +1, -1, +1, +1$ . The total is 0, or average size... an average size pup from 2*

*average sized parents. Not surprising.*

*Pup #2: Take (again, at random) 3 minuses from Dad and three minuses from Mom. What size pup do we get? Pup #2 is -1,-1,-1,-1,-1,-1. The total is -6, or one very tiny puppy.*

*Pup #3: Let's have all the pluses that both Mom and Dad can give (this combination can also happen randomly). That's +1,+1,+1,+1,+1,+1 = 6, and results in a Chihuahua much larger than either parent.*

*When you see how size is inherited, it all starts to make sense doesn't it? But genetics is only part of the story with regard to size.*

*It has been well documented that the human race is getting bigger and taller with each generation. When you look through museum reproductions of early settler's cottages, the height of doorways and the length of beds stand out as being quite small by today's standards.*

*This gradual, but steady increase in the size of humans has been attributed by scientists to improvements in diet and health care over the years. Diet is just one factor in what is generally referred to as "environment", and environment plays a major role in the size of Chihuahuas as well. Proper nutrition, maternal care, warmth and exercise all contribute to growth in a puppy.*

*The last variable in determining size is a congenital factor affecting growth. New research from the Canine Genome Project has shown a link between size and thyroid development. What is not clear yet is whether size is effecting the development of the thyroid or the development of the thyroid is affecting size. It is well documented, however, that the very tiny examples of our breed have more frequent and serious health problems than normal sized Chihuahuas.*

*(Found on the Internet and repeated from a past chatter)*