INHERITANCE OF COAT COLOR IN THE LABRADOR RETRIEVER
Adam Strom MS
Senior Veterinary Student

Labrador retrievers have coats of three basic colors: yellow, black, and chocolate. These colors are determined genetically, just like almost all of the traits that offspring get from their parents. The mode of inheritance of coat color is autosomal (not related to the sex of the dog), with the information for black and brown at a different location in the chromosomes (locus) from the information for yellow.

BLACK OR CHOCOLATE?
In determining if your puppies will be black or chocolate, the black coat color (B) is dominant to the chocolate (b). Therefore, a puppy will only be chocolate if each parent contributes the chocolate gene (bb). If one (Bb) or both (BB) parents contribute the black (dominant) gene, the puppy will be black (BB or Bb), although it can carry chocolate (Bb).

WHAT ABOUT YELLOW?
The gene that determines if your Labrador puppies will be yellow or not is at a different location, (locus) in the DNA from the black versus chocolate gene. In order to be yellow, a Labrador must have two recessive copies of the yellow gene (yy). In this case, the yellow color completely inactivates the black or brown genes, and the puppy is yellow. This means both parents contributed a yellow gene (y). However, if only one (Yy) or no (YY) yellow genes are contributed, the puppy will be either black or chocolate, determined as explained above by what is on the black/chocolate gene. Two yellow labs (yy) can only have yellow puppies (yy), since they both have two copies of the yellow gene and that is all they can contribute. On the other hand, some black (BbYy or BBYy) and chocolate (bbYy) Labradors carry one copy of the yellow gene, and if they are bred there is a chance that some puppies, by luck, will get a copy from each parent and turn out yellow (Bbyy, BByy or bbyy).

TAN POINT? WHAT’S THIS?
To make matters even more confusing, at yet another location there is a gene for tan point, which makes Labradors be colored similarly to Rottweilers or Dobermans. In order to see this, a puppy must have two copies of this gene, i.e. get one from each parent. If the puppy has the genes for black or chocolate as explained above AND two copies of tan point, it will be its predetermined color with tan markings. However, if it has the genes for yellow, the tan point features are hidden, and it will be yellow.

HOW WILL I KNOW?
If you are interested in breeding your Labrador and would like to know the genetic make up of your bitch and dog to predict how your puppies can turn out, there are genetic tests available. One company that offers the service is VetGen (www.vetgen.com). It is an easy, non-invasive test in which you take a swab of the inside of your dog’s cheek and send it off to the lab. The cost is $85, and they will be able to tell you the complete coat color genetic information of your dog.