



## THE GENETICS OF GREY – Kathleen Irwin

How a foal gets to be grey is a fascinating trick of genetics. First of all, when discussing horses and genetics, you must realize that grey is not a color. It is a color modifier -- a gradual loss of pigmentation in a coat of some other base color. So-called grey-colored horses are actually born chestnut, bay, brown or even black, but begin to “turn grey” starting almost immediately. This greying becomes more evident with maturity and a foal that was somewhat grey at birth may be practically white within a few years.



The series of photos above show the same grey horse (Holy Bull) at different stages of maturity. Jockey Club records describe Holy Bull’s color as “grey”, but if they were going to be genetically accurate, it would be described as “dark bay/brown with grey modifier.”

As mentioned in my previous article on color, the foal inherits two color genes, one from each parent. The same holds true for the grey modifier. The grey modifier gene is like a light switch. It is either “on” or “off”. If the parent passes on the gene in the “off” position, the foal will not appear to be grey. If it passes the gene in the “on” position, the foal will exhibit greying.

If we label the grey On as a big “G” and the grey Off as a little “g”, you can see how various combinations received from each parent will result in the coat color modification of the foal:

GG = grey foal      Gg = grey foal      gg = non-grey foal

Grey (in the “on” position) is a dominant gene. Nothing else inherited will override it.

A horse can be grey, yet produce non-grey offspring. Such a horse is clearly carrying a Gg combination, passing on G to some foals and g to others.

However, if a foal is grey (G), you can be certain that one of its parents is also grey (G). The First Rule of Grey is “It takes a grey to make a grey.” That is because the only way a horse will “look” grey is if it has received the grey gene in the “on” position. In order for that to happen, one of the parents had to have the grey gene “on” in order to pass it to the foal. And if the grey gene was “on” in the parent, then the parent was grey.

A horse that carries the GG combination, such as stallion Wekiva Springs, clearly has two grey parents. Furthermore, every single one of his offspring will be grey because G is the only option the foal can inherit from him.



Because it takes a grey to make a grey, it is easy to follow the grey line back through a pedigree, all the way back to the horse's earliest known grey ancestor.

Below is a 5-generation pedigree for Team Valor's grey filly Liberty Bond. I have color-coded the chart to show the basic color exhibited by each horse in the family. You can see that while each grey horse did not necessarily have a grey foal, every grey foal must have at least one grey parent.

If you look at this same pedigree at [www.pedigreequery.com](http://www.pedigreequery.com) you will be able to follow the uninterrupted grey line back into the early 1600's when the breed was being formed.

LIBERTY BOND, 2011 Grey Filly				
			Nearctic	Nearco
		Northern Dancer		Lady Angela
			Natalma	Native Dancer
	Danzig			Almahmoud
			Admiral's Voyage	Crafty Admiral
War Front		Pas De Nom		Olympia Lou
				Petitioner
				Petition
				Steady Aim
	Starry Dreamer	Rubiano	Fappiano	Mr Prospector
				Killaloe
			Ruby Slippers	Nijinsky
				Moon Glitter
		Lara's Star	Forli	Aristophanes
				Trevisa
			True Reality	Round Table
				Secret Promise
	Awesome Again	Deputy Minister	Vice Regent	Northern Dancer
				Victoria Regina
			Mint Copy	Bunty's Flight
				Shakney
		Primal Force	Blushing Groom	Red God
				Runaway Bride
Smooth Brandy	Royal Corona		Prime Prospect	Mr Prospector
				Square Generation
		Holy Bull	Great Above	Minnesota Mac
				Ta Wee
			Sharon Brown	Al Hattab
				Agathe's Dawn
		Miss Oceanette	Miswaki	Mr. Prospector
				Hopespringseternal
			Devils Oceanette	Devils Bag
				Oceans Answer

Next up in this series: How Grey Differs from Roan, and Why The Jockey Club Needs to Stop Describing Thoroughbreds as "Grey or Roan."