

# BFCA *Health Times*

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## **The Big (and Small) Six**

**02/12/2014**

**Domesticated dogs come in an extraordinary variety of shapes and sizes. From the tiniest teacup terrier to the largest Leonberger, the differences are astounding, and dogs have a greater diversity in body size than any other animal that walks on land. Humans have actively and intentionally been breeding dogs to conform to their needs and desires for hundreds of years. Still, it sometimes seems incredible that such an impressive diversity of sizes has been attained.**

**Recently, an international group of scientists discovered something that makes it even more incredible. In a study published in the September 2013 issue of *Genome Research*, they determined that approximately half of the weight differences seen across dog breeds can be explained by variations in and around *only six genes*. With support from the AKC Canine Health Foundation, the researchers were able to analyze the relevant sections of the genome in 500 dogs from more than 90 breeds and compare them to ancestral genotypes found in wild wolves, foxes, and coyotes. Doing so has uncovered an enormous amount of data about how genetics influence size.**

**One of the most interesting findings of the research was that as the scientists looked at smaller and smaller breeds, they saw ever increasing numbers of genetic differences between those dogs and the ancestral canids. In some ways, that was not unexpected, as larger breed dogs are more similar in size to their wild cousins. However, it wasn't that certain**

genes varied in dogs of specific sizes. Instead, smaller dogs had more variation in all of the alleles than their larger cousins. The notable exception to this rule was giant breed dogs, whose size was only poorly explained by the markers examined in this study. That suggests variations in the researched genes are capable of making dogs smaller but that it may take different areas of mutation, or possibly other factors, to make dogs even larger.

The selective breeding of dogs to create clearly defined, and highly divergent, breed standards has made them an ideal system for understanding the role of genetics in determining height, weight, and other aspects of adult size. Dogs of each breed are similar in appearance and have significantly less genetic diversity than seen in other species. That lack of within-breed diversity makes it easier to link specific genes to their determined traits than it would be in a more chaotically variable species – such as humanity.

That said, the fact that dogs are uniquely suitable for this type of research doesn't mean that discoveries based on the canine genome are only relevant to them. Studies such as this one can also provide insight into some of the size differences seen in humans and other species. Four of the genes identified by this research have already been linked to variations in human height, and the fifth has been shown to be associated with growth changes in mice. These research findings may increase our understanding of growth-related health concerns in both dogs and humans.

<http://www.akcchf.org/research/success-stories/the-big-and-small-six.htm>  
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**Wikipedia:**

**Animal husbandry** is the management and care of farm animals by humans for profit, in which genetic qualities and behaviour, considered to be advantageous to humans, are further developed. The term can refer to the practice of [selectively breeding](#) and raising livestock to promote desirable traits in animals for utility, sport, pleasure, or research.<sup>[1]</sup>

**Encyclopedia Britannica:**

**Animal husbandry**, Controlled cultivation, management, and production of domestic animals, including improvement of the qualities considered desirable by humans by means of [breeding](#). Animals are bred and raised for utility (e.g., [food](#), fur), sport, pleasure, and research.

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The previous article from the American Kennel Club-Canine Health Foundation discusses research showing the size differences in dogs is the variation (mutation) of only six genes. As a breed with size limitations, this six-gene variation looms important for breeders of the Bichon Frise. Aside from “The Big (and Small) Six” being interesting, it drives home the importance of understanding genetic science. Most dog breeders do not identify themselves as being in animal husbandry any more than cattle breeders or horse breeders do, but from the descriptions above, that is exactly the identification of a Bichon breeder, “selectively breeding and raising livestock to promote desirable traits” or “improvement of qualities considered desirable by humans by means of breeding”.

Fifty-plus years ago canine breedings were planned via subjective observations and theories. “Planned Breeding”, by Lloyd C. Brackett, p.29, 1961, “Let the sire of the sire be the grandsire of the dam, on the dam’s side.” Some breeders were known to give credit to the sire saying he escaped from his kennel and bred a certain bitch because he knew they would make beautiful puppies. As recent genetic research has opened the door to breeders’ ability to manipulate and control genes, a breeder has to know how and when to use genetic science. Older breeders may excuse themselves at their lack of understanding because younger breeders were exposed to genetics to some extent in school science classes. Logically, that is no excuse as there is no lack of published books on genetics nor lack of articles on the internet. A practicing orthopaedic surgeon was asked why he kept attending seminars on the same subject. His answer was that he kept attending until he no longer learned anything new. The Bichon Frise breeder should be as diligent in reading and re-reading books and articles on genetics and attending again and again seminars on the subject. Genetics is not a passing phase; it is here today and is the future.

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# Updates on Research

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## Morris Animal Foundation Understanding How Mammary Cancer Develops Gerlinde R. Van de Walle, PhD, Cornell University

Mammary tumors are one of the most common cancers in female dogs. Increasing evidence suggests that an enzyme, peptidylarginine deiminase (PAD), has an important role in mammary tumor progression. PAD can change the structure and function of other proteins through a process called citrullination, which helps transform normal cells into cancer cells.

With Morris Animal Foundation funding, researchers from Cornell University are investigating PAD-mediated changes in canine mammary cancer stem cells; data suggest that mammary stem cells are the primary targets for cancer development. The team has successfully isolated healthy and cancerous mammary stem cells for comparative analysis and has improved ways to generate their progeny for comprehensive study. Studying how PAD expression differs in healthy versus cancerous cells and tissue could lead to identification of a biomarker that is a potential chemotherapeutic target for mammary cancer in dogs.

Over the next year, the researchers will study if PAD inhibitors can affect the growth and migration of canine mammary cancer cells in a laboratory setting. If they are successful, their findings could contribute to the development of more targeted and less toxic therapeutics for dogs with mammary cancers. (D14CA-063)

October 14, 2014

### CHIC REPORT 3<sup>rd</sup> QUARTER 2014

#### SUMMARY OF TOTAL CHIC NUMBERS AND UPDATES FOR BFCA TO DATE

ORIGINAL QUALIFIERS	362	July 2007
NEW 3 <sup>rd</sup> QUARTER QUALIFIERS	13	
TOTAL NEW QUALIFIERS	864	October 2014
ORIGINAL UPDATES	52	July 2007
NEW 3 <sup>rd</sup> QUARTER UPDATES	15	
TOTAL UPDATES	367	October 2014

January 7, 2015

## **CHIC REPORT 4<sup>TH</sup> QUARTER 2014**

### **SUMMARY OF TOTAL CHIC NUMBERS ANDD UPDATES FOR BFCA TO DATE**

ORIGINAL QUALIFIER	362	July 2007
<u>NEW 4<sup>TH</sup> QUARTER QUALIFIERS</u>	<u>11</u>	
TOTAL NEW QUALIFERS	875	January 2015
ORIGINAL UPDATES	52	July 2007 January 7, 2015
<u>NEW 4<sup>TH</sup> QUARTER UPDATES</u>	<u>11</u>	
TOTAL UPDATES	367	January 2015

January 6, 2015

### **CHIC 5 STAR AWARDS**

The BFCA Health Committee has issued the first of the CHIC 5 Star Awards to the following:

Merrymaker's Living Doll	Cindy Morey	11/15/09
Merryell Absolutely Spellbound	Mayno Blanding	11/29/09
Jasme Raggedy Ann	Mayno Blanding	11/29/09
Victoire's Cheers to Austin	Vickie Halstead	11/30/09
Victoire L'Amour Champagne Lace	Vickie Halstead	11/30/09
Victoire Juniper's Hot Tamale	Vickie Halstead	11/30/09
Victorie's Norwegian Red	Vickie Halstead	11/30/09
Victoire Melodie's Bleu Reign	Melodie Michel	11/30/09
Victoire Diamond Rio Citrine	David & Darlene Scheiris	12/02/09
Mybliss Galway's Irish Imp	Nancy Noonan	06/06/10

White Shadow Galaway Hide N'Seek	Nancy Noonan	06/06/10
Allure's U Chenoa Joe	Lisa Des Camps	10/01/10
Victorie Gerie No Lemon Gemstone	Vickie Halstead, Mary Wangsness	11/30/10
Paray Parasol of Knollwood	Susan & Dean Anneser	12/1/10
Paray's Secret Encounter	Susan & Dean Anneser	12/1/10
Merrymaker's Southern Charm of Bibelot	Cindy Morey	1/13/11
MyBliss Petite Coquette	Loretta McDonald	3/16/11
Jabree's Jack of Hearts	Nita & Mark Gryan	3/23/11
Bibelot's Sugar Plum Dancer	Paula Hendricks	6/6/11
Bibelot's Purple Heart O'Mine	Matt & Paula Abbott	9/12/11
Jabree's Bellefleur La Jolie	Nita & Mark Gryan	12/19/11
Bijone's Mon Cheri Music of the Nite	Susan Brockett, Barbara Shaffer Nicole Shaffer	1/4/12
Mybliss Dandy Devil Wears White	Myra Wotton, Jan & Alan Shetzer	1/5/12
Crème's Fool's Rush In	Carol Haines	5/3/12
Crème's Brandy Alexanderia	Carol Haines	5/3/12
Crème's Madam President	Carol Haines	5/3/12
Mybliss Expertly Engineered	Myra Wotton	7/26/12
Luvit's A Rolex Cellissima At Dalnavert	Linda Ross, Bernice & Brian Lucas	8/1/12
Saks Winning Card	Sandra & Kieth Hanson	8/6/12
Saks Hamelot Little Drummer Boy	Sandra & Kieth Hanson	8/6/12
Bella Diamella Sunday Surprize	Stephanie Uva, Katherine Dillon, Lisa Des Camps	8/19/12
MyBliss Sport Edition At Bella	Stephanie Uva, Myra Wotton	8/19/12
Luvit's A Rolex Yacht-master At Dalnavert	Bernice & Brian Lucas, Linda Ross, Marilyn Torrance	11/7/12
Luvit's a Rolex Daytona At Dalnavert	Linda Ross, Bernice & Brian Lucas	11/26/12
Bibelot's Destiny Awaits	Paula Hendricks, Gina Pantely	11/26/12
Victoire Phantom's Devil in Disguise	Diana Bugos, Vickie Halstead	12/4/12

Luvit's Dalnavert Double Destiny	Linda Ross, Bernice & Brian Lucas	1/11/13
Craigdale Chip Off The Rock	Cheryl Blair & Patricia Dale Hunter	2/28/13
Knollwood's Henry	Susan Anneser & Dean Anneser	3/11/13
Luvit's Dalnavert Olympic Omegamania	Jill SanFilippo, Linda Ross, Bernice & Brian Lucas	3/11/13
Bibelot's Witchful Thinking	Paula Hendricks, Janet Jamison	5/13/13
Miabella Dancing Queen	Sheryl Kapella	6/3/13
Miabella Head Over Heels	Sheryl Kapella	6/3/13
Hollyhock She Returns	Debra Gibb, Linda Rowe	6/18/13
Dorian's Saks Hollywood Bombshell	Michelle and Carol Konick	10/29/13
Doriann's Tennessee Gentleman Jack	Michelle and Carol Konick	10/29/13
Doriann's The Duke of Prelude	Michelle and Carol Knoick	10/29/13
She Bichons Elizabeth Taylor	Sharon E. Hunkins	2/15/14
She Bichons Sundance Kid	Sharon E. Hunkins & Dale Schwab	2/25/14
She Bichons Gary Cooper	Debra Gibb and Sharon Hunkins	7/3/14
She Bichons Betsy Ross	Sandy Fishell & Sharon E. Hunkins	11/19/14
Merryell Defying Gravity	Mayno Blandling	11/19/14
Dorrian's Hunk of Burnin' Love	Michelle Brosdal and Carol Konik	1/8/15

<http://bichonhealth.com/Catalog/PDF/CHIC-5-STAR-AWARD-APPLICATION.pdf>

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“A human walk in the twilight is a pallid affair to that being experienced by their dog. Rabbit. Mouse. The dog at the house next door. The ginger tom. Toffee. Dead bird. Earthworm. Pizza wrappings. The dog from number seven. Unknown cat. Frog.” Pam Brown, b. 1928