Congratulations!

Buddy is a Cocker Spaniel

In the following pages, you will learn about:

- KEY BREEDS DETECTED
- KEY BREED HISTORY, APPEARANCE, AND BEHAVIOR
- HOW KEY PHYSICAL TRAITS ARE INHERITED
- OTHER POSSIBLE MIXED BREED SIGNATURES
- PREDICTED WEIGHT
- HOW TO UPLOAD A PHOTO AND SHARE YOUR STORY
- ADDITIONAL INFORMATION
April 19, 2013

Dear Pete,

As part of the Wisdom Panel® Insights™ analysis, we have considered if Buddy's results are consistent with the purebred Cocker Spaniel samples in our database using a variety of analyses. The results show that Buddy's results are indeed consistent with the purebred Cocker Spaniel samples in the Wisdom Panel database.

This is due to the following observed results:

- In a Principal Component Analysis (PCA), Buddy's DNA sample appears within the Cocker Spaniel cluster.
- In a PCA, Buddy's DNA sample appears within the Cocker Spaniel cluster when also compared to an outgroup.
- In a PCA, Buddy's DNA sample appears within the Cocker Spaniel cluster when compared to samples of the two next best matched breeds in the Wisdom Panel Ancestry analysis.
- The Cocker Spaniel is detected as the sole predominant breed in a Wisdom Panel ancestry analysis.
- The Cocker Spaniel is the top matching breed in a pairwise comparison analysis between Buddy's DNA data and all the purebred dogs in the Wisdom Panel database.
- The Cocker Spaniel is detected most frequently in the top 20 best matched dogs in an individual pairwise comparison analysis with all of the nearly 10,000 dogs in the Wisdom Panel database.
- The observed homozygosity of Buddy's DNA data is within the expected range for this breed.

A more detailed explanation of the specific tests performed on Buddy's DNA data are explained in the Further Analysis section at the end of the report.

If you have any questions about the information enclosed, please contact our customer care team at customercare@marsveterinary.com.

Regards,

[Signature]

DR. NEALE FRETWELL
Research & Development Director
YOU HAVE A COCKER SPANIEL

The Wisdom Panel Insights computer algorithm performed over seven million calculations using 11 different models (from a single breed to complex combinations of breeds) to predict the most likely combination of pure and mixed breed dogs in the last 3 ancestral generations that best fit the DNA marker pattern observed in Buddy. The ancestry chart depicting the best statistical result of this analysis is shown in the picture below.

While Wisdom Panel Insights is not designed as a pure bred test our results indicate that the recent ancestry of Buddy only includes Cocker Spaniel.

Learn more about this breed on the following pages...
Cocker Spaniel

The American Cocker Spaniel was one of the first Cocker Spaniels introduced into the Americas and it is a breed that has become very popular in the United States. Their ancestors may be traced back to fourteenth century Spain to a breed known as the “Spanyell.” Legend has it that the ancestor of the Cocker Spaniel, the English Cocker Spaniel, was on the HMS Mayflower when the boat arrived in the Americas in 1620. Since that time, Cocker Spaniels have been the constant companion of settlers and have played an important role in hunting and guarding the family. The Cocker Spaniel is much smaller than its ancestor, the English Cocker Spaniel. In 1878, the first dogs were recorded in the American Kennel Club Studbook.

The Cocker Spaniel comes in solid with tan points, particolor, with ticking or white markings also possible. The underlying color varies widely, and may be black, or any color from a pale cream to a deep red, including roan and silver.

DO YOU RECOGNIZE ANY OF THESE COCKER SPANIEL TRAITS IN BUDDY?

- Intelligent, playful, happy, and usually friendly dogs, with some being very energetic.
- Respond well to reward-based training using treats or favorite toys; can help in reducing tendencies to retrieve and play with inappropriate items.
- Seem to enjoy dog sports such as hunting, tracking, retrieving, agility, rally and competitive obedience.
- Good family dog but may require careful socialization with strangers to prevent or reduce fear-based defensive behaviors.
Comparison against purebred samples of Cocker Spaniel, and your dog Buddy

PCA Analysis of Buddy’s DNA sample and Cocker Spaniel samples from the Wisdom Panel database:

Principle Component Analysis (PCA) allows us to see how similar samples are. Closely related samples, like dogs from the same breed, will be expected to be closer together than samples from other breeds. This tends to create a cluster of points for each breed or sub-population within a breed. If a sample is within the cluster for the breed, this is a very good indication that it is likely a pure member of this breed. The PCA below shows Buddy’s data compared to Cocker Spaniel samples from the Wisdom Panel database. The sample falls within the Cocker Spaniel cluster indicating that its genetic profile is consistent with other dogs from this breed.

PCA Analysis of Buddy’s DNA data including Cocker Spaniel samples and an All Breeds outgroup:

The PCA below shows Buddy's data compared to samples of Cocker Spaniel, as well as an All Breeds outgroup comprised of a single representative sample from the other breeds in the Wisdom Panel database. This is another means of verifying that Buddy's data is more consistent with the Cocker Spaniel than with any other breed and here the sample is clustering closely with the purebred Cocker Spaniel cluster.
PCA Analysis of Buddy’s DNA sample, Cocker Spaniel and the two next closest matching breeds in the Wisdom Panel analysis:

The PCA below shows Buddy’s data compared to Cocker Spaniel samples, as well as samples of the next two best matched breeds from the Wisdom Panel Ancestry analysis. Buddy’s DNA sample clusters tightly with the purebred Cocker Spaniel cluster. This is what we would expect from a purebred Cocker Spaniel.

Pairwise Comparison Testing for the Best Overall Breed Match:

A pairwise comparison test was performed between Buddy’s DNA data and that of each of nearly 10,000 dogs in the Wisdom Panel purebred dog database. In this analysis the top matching breed detected is the Cocker Spaniel.

Pairwise Comparison Testing for Match to the Top 20 Database Samples:

A pairwise comparison test was performed between Buddy's DNA profile and that of each of nearly 10,000 dogs in the Wisdom Panel purebred dog database. Looking at individual samples, the Cocker Spaniel occurred most often in the top 20 ranked sample matches in this analysis. This is what we would expect from a purebred Cocker Spaniel.
Homozygosity Profile:
Homozygosity is a measure of how many of Buddy's genetic markers are identical because both the sire and dam passed down the same marker variant. Purebred dogs tend to have a higher homozygosity than most mixed breed dogs. Each breed within the Wisdom Panel database has a specific range of homozygosity scores. Buddy's homozygosity score falls within the range that is seen for purebred Cocker Spaniel samples.

Further Information
You may wish to research more information regarding the breeds found in Buddy. The following links provide useful information into breed characteristics, training and health.

- The American Kennel Club (AKC) provides information on AKC registered and Foundation Stock Service breeds at www.akc.org.
- The United Kennel Club (UKC) has a range of information on UKC registered breeds at www.ukcdogs.com.
- The Kennel Club is the major British registry and their website contains information about the breeds they register at www.thekennelclub.org.uk.
- The free encyclopedia Wikipedia contains a range of information on most breeds, including breed histories, at www.wikipedia.org.
- The Dog Breed Info Center has information on most breeds at www.dogbreedinfo.com.
- The Australian Pedigree website has a very detailed breed library which includes temperament and what breeds are like to live with at www.pedigree.com.au.
- The Wisdom Panel website contains additional information about the breeds, as well as our Photo Gallery at www.wisdompanel.com.

Breed standards may vary between registries and can result in ambiguity of breed traits, which may be acceptable with some registries but not others. Additionally, the requirements of registration may differ between registries. Please check with the specific kennel club or registry to determine their registration requirements.
PREDICTED ADULT WEIGHT PROFILE:

Based upon the breeds detected in Buddy’s ancestry and the genetic markers analyzed by Wisdom Panel® Insights™, as well as the information provided that Buddy is Male, we have calculated the likely weight that Buddy should reach when an adult. The Wisdom Panel Insights target weight profile is presented as a range based on the unique mix and proportion of breeds detected.

- If Intact, the adult weight is predicted to be between 20 - 36 lbs.
- If Neutered, the adult weight is predicted to be between 23 - 39 lbs.

Many factors can influence an adult dog’s weight, including sex and neuter status. Both of these factors have been used to calculate the predicted weight profile. Another major influence on canine weight is body condition score, which is a factor of your dog’s lifetime nutrition and exercise regimen. If your dog’s body condition is different from the ideal body condition score, we anticipate that your dog might be under (if underweight) or over (if overweight) the weight predicted by Wisdom Panel Insights.

To learn more about assessing body condition score, please use the Royal Canin™ Body Condition Score Chart: http://www.royalcanin.co.uk/products/products/dog-s-body-condition2

More information on this can be found at: http://www.wisdompanelpro.com/sizeprediction/

CUSTOMIZE YOUR DOG’S CERTIFICATE:

You can now include a photo of your dog on your certificate.

- Simply go to: http://www.wisdompanel.com/test_status_checker/ or go to www.wisdompanel.com and click on the TEST STATUS CHECKER box at the top
- Enter your last name and test sample ID #
- Click on the UPLOAD PHOTO button
- Follow the pop-up instructions to upload your dog’s photo

BECAUSE YOU LOVE YOUR DOG - SHARE THEIR STORY!

Join our online community of dog owners and share your dog’s Wisdom Panel Insights story with the world. At WisdomPanel.com you can:

- Register your dog and upload photos into our Wisdom Panel photo gallery at: http://www.wisdompanel.com/photo_gallery/
- Get help to show off your dog’s breed profile on your blog, Facebook and Twitter

Use these details to create your dog’s profile at wisdompanel.com:  

Owner: Pete Smith  
Report Code: 4500001900

You can also post your story on our Facebook page, Doggie DNA, and don’t forget to follow us on Twitter!
Thank you for using Wisdom Panel® Insights™ to uncover the story of your dog's ancestry!

Congratulations on taking the steps to learn about Buddy's ancestry and to understand what breeds are in your mixed breed dog using Wisdom Panel Insights! Knowing your dog's breeds is more than a novelty - it is a medical necessity. Each breed in your pooch's genetic paw print has unique health concerns you should know about so that you can provide a lifetime of excellent care.

We recommend discussing your dog’s ancestry report with your veterinarian, as he or she can help you use your Wisdom Panel Insights report to help better care for Buddy. The next time you visit your veterinarian, consider asking these questions in addition to any you come up with on your own:

- Are there any specific issues that may be relevant to my dog’s well-being?
- Are there any special techniques that may help in training a dog with this particular mix?
- Are there any particular dietary considerations to bear in mind for a dog like mine?

**HOW WISDOM PANEL INSIGHTS WORKS**

The process started when you sent a sample to our laboratory, where the DNA was extracted from the cells and examined for the 321 markers that are used in the test. The results for these markers were sent to a computer, that evaluated them using a program designed to consider all of the pedigree trees that are possible in the last three generations. The trees considered include a simple pedigree with a single breed (a likely pure-bred dog), two different breeds at the parental level (a first-generation cross), all the way up to a complex tree with eight different great-grandparent breeds allowed.

Our computer used information from over 200 breeds and varieties from our breed database to fill these potential pedigrees. For each of the millions of combinations of ancestry trees built and considered, the computer gave each a score representing how well that selected combination of breeds matched to your dog's data. The pedigree with the overall best score is the one which is shown on the ancestry chart. Only breeds that reached our set confidence threshold for reporting are reported in the ancestry chart.

**MORE BREED INFORMATION**

Visit [www.Genesis4Pets.com](http://www.Genesis4Pets.com) to find out more about your dog’s health-care needs: you’ll feel better knowing that you’re doing everything you can to keep your pal happy and healthy. In addition to loads of free, easy-to-understand information based on the latest medical research, you will receive a 50% discount on all downloadable health-care booklets that explain the common health concerns for individual breeds. Simply enter promotional code WISDOM when you check out to receive your discount (expires 30 days after you receive your Wisdom Panel report).

Accessing your test status checker online also lets you view Mixed-Breed Genesis health reports provided by VetThink™ which are designed to assist you to take the best possible care of your dog throughout its life.
Each dog is unique and their physical and behavioral traits will be the result of multiple factors, including genetics, training, handling, and environment. Using a proprietary analysis and database, Wisdom Panel® 2.0 product can provide insight into the breed ancestry of your dog. The Wisdom Panel 2.0 product is designed and intended to be used solely to either identify the genetic breed makeup and predict the adult size of such a mixed-breed dog or to confirm the genetic profile observed in a tested dog matches a particular breed profile. No other purpose is intended, authorized, or permitted.

Upon receipt of your sample, Mars Veterinary will analyze your dog’s DNA to determine the breed(s) present in your dog’s recent ancestry. In the case of a likely purebred dog, this will involve a comparison of genetic profile in your dog to a proposed breed. In the case of a proposed crossbred dog (i.e. a dog with ancestry from two different purebred parents), this will involve determining the heritage of your dog’s sire and dam. In all cases this is done with a reasonable degree of certainty.

Mars Veterinary’s testing procedures are designed to provide reliable and accurate results. Mars Veterinary is not responsible for any errors in obtaining the swab sample or for any injuries or loss that may occur as a result.

In the unlikely event that it is not possible to determine breed history or that an error in the analysis occurs, liability by Mars Veterinary or related companies and individuals is expressly disclaimed. Damages, if any, are limited to the payment actually received by Mars Veterinary for the specified analysis at issue.

Wisdom Panel 2.0 is based upon the Mars Veterinary database of validated breeds. If your dog contains other breeds, it may result in the identification of breeds, or a combination of breeds in the database, related to the breeds in your pet’s history.

Many cities and communities have breed-specific ordinances and laws that may require special handling or prohibit the ownership of some dogs with a particular breed in their genetic background. Wisdom Panel 2.0 is not intended to be used by regulatory or animal control officials to determine whether a particular breed is legislated or banned in a particular community. Neither Mars Veterinary nor any related company is responsible for compliance or notification regarding these matters.
STATEMENT OF AUTHENTICATION

Owner's name: Pete Smith
Dog's name: Buddy
Date: April 19, 2013

This certifies the authenticity of Buddy's canine genetic background as determined following careful analysis of more than 300 genetic markers using Wisdom Panel® Insights™. The purebred dog breed signatures included in this analysis are those that were detected in the last three generations of Buddy's ancestry using the proprietary breed detection algorithm at Mars Veterinary. The certified breed is a Cocker Spaniel.

Buddy is a Cocker Spaniel.

DR. NEALE FRETWELL
Research & Development Director

This certifies the authenticity of Buddy's canine genetic background.

Date: April 19, 2013
Dog's name: Buddy
Owner's name: Pete Smith