

# Portuguese Water Dog Foundation, Inc.



## 2012 FALL UPDATE

### NEW PROJECT CO-SPONSORED WITH AKC CHF

#### **1684: Plasma cortisol concentration in dogs with pituitary dependent hyperadrenocorticism and atypical Cushing's syndrome**

Dr. Linda Frank, DVM

University of Tennessee

#### **Abstract**

Atypical Cushing's syndrome is diagnosed when dogs have clinical signs suggestive of Cushing's disease (drinking a lot, infections, losing hair), but increases in peak cortisol concentration are not detected with routine tests. A popular explanation for this syndrome is that hormones that precede cortisol formation may be increased and are responsible for the clinical presentation. This phenomenon has been well-documented in dogs with adrenal tumors but is less clear when an adrenal tumor is absent. One argument against this explanation is that normal, intact female dogs have substantial elevations in precursor hormones, much higher than dogs with clinical signs of atypical Cushing's syndrome, yet they do not have any clinical signs. Also these precursor hormones have very short half-lives. We hypothesize that the clinical signs associated with atypical Cushing's syndrome are actually due to continuously increased cortisol production, instead of increased peak production, resulting in greater than normal 24 hour (24-hr) cortisol secretion even though peak concentration remains normal. With the exception of housing a dog in a metabolic cage and collecting all urine for 24 hours, there is no simple test to measure 24-hr cortisol secretion. Intermittent samplings have been used to document normal patterns of cortisol secretion and increased cortisol in dogs with Cushing's syndrome. We propose to use a modified version of these techniques to assess whether dogs with atypical Cushing's syndrome produce increased cortisol over a certain time period.

### 3 PROJECTS CO-SPONSORED WITH MAF FOR ANOTHER YEAR

#### **D10CA-002 Safety & Efficacy of a Novel Anthracycline, AD 198 in Dogs with Refractory Lymphoma**

Alfred M. Legendre, DVM, MS, DACVIM

University of Tennessee

**Recap:** Lymphoma is a common tumor of the lymph nodes of dogs that is rarely cured because the tumor becomes resistant to chemotherapy. AD 198 is a new anthracycline drug that is similar to doxorubicin, which is used in chemotherapy. Though very effective, doxorubicin causes heart toxicity, which limits the total amount that can be safely given. AD 198 shows promise in treating lymphomas that are resistant to doxorubicin, and it does not produce heart toxicity. An injectable formulation of AD 198 has been developed and evaluated in healthy dogs. This study will determine the best dose for dogs with lymphoma, and researchers will study how well AD 198 affects cancer cells so that an alternative treatment option can be available to owners and veterinarians.

#### **D10CA-501 MADGiC: Making Advanced Discoveries in Golden Cancers**

For more info please see MAF progress report on page 2

#### **D12CA-026 Developing Antibody Fragments for Targeted Treatment of B-cell Lymphoma**

For more info please see MAF progress report on page 4

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## MAF CO-SPONSORED RESEARCH PROGRESS REPORTS

## AKC CHF CO-SPONSORED RESEARCH PROGRESS REPORTS

### **D09CA-060: Characterization of MicroRNA Dysregulation in Canine Mast Cell Tumors - Lay Title: Studying How Mast Cell Tumors Become Malignant**

Cheryl A. London, DVM, PhD

Ohio State University

Mast cell tumors (MCTs) are the second most common type of cancer in dogs, and despite advances in treatments, the most aggressive forms of MCTs are frequently fatal. Identifying which MCTs are malignant, so they can be treated quickly, is challenging because these tumors often lack physical characteristics that differentiate benign tumors from malignant ones. Researchers at the Ohio State University, funded by the Morris Animal Foundation, are analyzing the expression of microRNAs (miRNAs) in hopes of identifying markers to differentiate between benign and malignant MCTs. The miRNAs are small non-protein-coding RNA molecules that have been shown to be involved in the initiation and progression of cancer in humans. Research findings indicate that specific miRNAs may contribute to biologically aggressive tumors. To date, researchers have identified 51 miRNAs that are differentially expressed in malignant versus benign tumors in dogs. Specifically, they have identified one miRNA whose overexpression is associated with mast cell invasion and aggressive behavior. To determine if this miRNA is responsible for the aggressive behavior of malignant mast cells, the researchers are manipulating its expression in cell lines and cultured mast cells and have made significant progress toward defining its role in canine MCTs. This study is providing the groundwork for the future development of potential diagnostics and therapeutic treatments for dogs with aggressive MCTs. Specific breeds pr predisposed to mast cell disease include Boxers, Bull Terriers, Pugs, Shar-peis and Labrador and Golden Retrievers. ♦

### **D10CA-501: Discovery and Characterization of Heritable and Somatic Cancer Mutations in Golden Retrievers**

Jaime F. Modiano, VMD, PhD, *University of Minnesota*

Matthew Breen, PhD, CBiol, FSB, *North Carolina State University*

Kerstin Lindblad-Toh, PhD, *Uppsala University, Sweden*

**Progress Report:** Golden Retrievers have been one of the most popular breeds in America for decades, but unfortunately these dogs also have one of the highest incidences of hemangiosarcoma (cancer derived from cells that line blood vessels) and lymphoma (cancer derived from lymphocytes, a type of white blood cell). In this three-

year, multi-institutional study, researchers are examining genetic traits that contribute to risk and progression of these cancers in Golden Retrievers. Comparison of blood-derived DNA samples from affected and unaffected Golden Retrievers has identified several candidate regions associated with hemangiosarcoma and lymphoma. Analysis of genome organization in the corresponding tumor samples has revealed numerous abnormalities, and evaluation of gene expression shows segregation into several groups with different biological behavior.

Although this study focuses on Golden Retrievers, hemangiosarcoma and lymphoma tumors occur in all breeds (including Portuguese Water Dogs), so the results of this study may be widely applicable to all dogs. The long-term goals are to understand what causes hemangiosarcoma and lymphoma and to develop strategies to prevent and treat these cancers. ♦

(MAF progress reports continued on page 4)

### **1429: Mechanistic Relationship of IL-8 in Cell Proliferation & Survival of Canine Hemangiosarcoma**

Jaime F Modiano, VMD PhD

*University of Minnesota*

**Progress Report:** We reported on effects of IL-8 on canine hemangiosarcoma cell proliferation in our year-end report. The data revealed paradoxical findings of IL-8 on cell proliferation that differed among different cell lines, and suggested a possible relationship between IL-8 and Slug (Snail2), indicating stem cell signaling activity. Our ongoing data validate the gene expression findings through direct IL-8 binding of IL-8 receptors on hemangiosarcoma cells and intracellular IL-8 staining by immunocytochemistry. Our results also show that neither the action of adding exogenous IL-8 to the cultures nor blocking endogenous IL-8 using a neutralizing antibody by themselves affect cell viability. These treatments also do not prevent apoptosis in growth factor-deprived cells or in doxorubicin-treated cells. We re-analyzed genome-wide gene expression data from hemangiosarcoma tissues and hemangiosarcoma cell lines supervising the data according to levels of IL-8 gene expression. The data show a hierarchy of gene expression that is similar to that found using unsupervised methods (see progress report for grant I131). The results support the hypothesis that hemangiosarcoma cells show lineage multipotency in vivo and in vitro, with IL-8 being inversely related to adipogenic differentiation potential. As both IL-8 and Slug are highly expressed in multipotent hemangiospheres, we believe it is possible that IL-8 supports self-renewal or multipotency and are currently expanding the scope of our project to test this hypothesis. Alternative, albeit not mutually exclusive hypotheses are that IL-8 plays important roles in cellular metabolism, and/or that IL-8 production is part of a stress response where cells seek to re-establish specific vascular and inflammatory properties in the tumor microenvironment. ♦

### **1131: Genetic Background and the Angiogenic Phenotype in Cancer**

Jaime F Modiano, VMD PhD

*University of Minnesota*

**Main Objective:** This project will continue the researchers' observations on gene appearance profiles in hemangiosarcoma from Golden Retrievers to German Shepherd Dogs and Portuguese Water Dogs, and it also will define how new targeted therapies may effectively control the disease in these and other dog breeds.

**Progress Report:** Data pertaining to aim 1 - establish unique gene expression signatures in HSA samples from each breed We have confirmed that there are unique, breed-related properties identifiable as

intrinsic properties of isolated hemangiosarcoma cells. However, in the context of tumors as tissues (that is, when tumor cells are considered in their whole environment), these differences are no longer apparent, suggesting that at least in advanced stages of the disease when tumors are collected, the role of breed specific factors is reduced or absent. Our data show that hemangiosarcoma represents at least two and perhaps three molecularly distinguishable conditions. Various biochemical processes appear to contribute to this molecular stratification, including adipogenesis, inflammation, coagulation, and angiogenesis. These processes also may modulate the multipotency of hemangiosarcoma cells and their interactions with the local microenvironment. Indeed, hemangiosarcoma cells themselves may comprise only a modest proportion of the tumors, with the vast majority of the tumor consisting of "reprogrammed" stromal cells such as tumor-associated fibroblasts, myeloid and inflammatory cells, and endothelial cells. Our

*The Spring and Fall Updates are publications  
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### The mission of the **Portuguese Water Dog Foundation**

is to generate significant  
resources to fund research into  
genetic and other canine diseases  
that will improve the life  
and health of all  
Portuguese Water Dogs.

(Continued on page 6)

# EARLY CANCER DETECTION TESTS: DO THEY WORK?

Originally published in the "[Golden Retriever News](#)" and reprinted with their permission

We are all familiar with recommendations from physicians and other health advocacy groups for various kinds of cancer screening tests, such as mammograms to detect breast cancer, colonoscopies to detect and prevent colon cancer, Pap smears to detect and prevent cervical cancer, and PSA tests to detect prostate cancer. What all of these tests have in common is the theme that early detection saves lives. We also know that in people, cancers for which there are no good methods of early detection such as ovarian cancer and pancreatic cancer are often so advanced at the time of diagnosis that cure rates are low.

With that as context, it's completely understandable that we would be eager to embrace technologies that offer early cancer detection for our dogs. Our natural expectation is that the earlier cancer is diagnosed, the better chance our dogs will have for a cure or improved prognosis. And of course, this is especially on the minds of owners of breeds at highest risk for cancer.

Therefore, the recent announcement of a new cancer detection blood test (INCaSe – Initial Notification Cancer Screen, VDI – Veterinary Diagnostic Institute) intended for use as "a wellness screen for the apparently healthy dog prior to the onset of visible signs" has raised a great deal of interest among dog owners. The most immediate question seems to be, "Does it really work?" While some of this discussion will be specific to this particular test, the general considerations can guide evaluation of other tests marketed for similar purposes.

VDI's INCaSe test uses measurements of thymidine kinase-1 (TKI) and C-reactive protein (CRP) in an undisclosed algorithmic formula to provide a result that is claimed to inform the owner with a high degree of accuracy that the dog is either at "increased risk for neoplasia or other disorder" (Positive); has a high probability of "active malignant disease" (High Positive); or at "low risk of major neoplastic disease in the next several months" (Negative). First we're going to discuss a little bit of the science behind this test (don't worry, just a few paragraphs!), and then we'll examine how "early cancer detection" screening as it currently stands impacts dogs and their owners.

Thymidine kinase-1 is an enzyme that is present in dividing cells, and since cancers by definition include uncontrolled cell division, it has long been known in humans that TKI levels increase in the presence of cancer. The most dramatic rise is in hematologic (blood) malignancies, and the primary use for TKI assays in humans is in monitoring remission in non-Hodgkin lymphoma. Note that it is not used as a screening test for early detection of disease in apparently healthy people, and we'll get back to that point in a minute.

A few small peer-reviewed (meeting accepted scientific standards) studies have validated that a rise in TKI also occurs in dogs with Lymphoma (LSA – 1st link below), and one recent study showed that TKI rises in dogs with hemangiosarcoma (HSA – 2nd link below). All of these studies compared TKI values in dogs with either LSA or HSA to normal dogs, and none of these studies included C-reactive protein testing (as does VDI's INCaSe test). CRP is a general measure of inflammation, and while it is not specific to cancer, elevated CRP has been associated with several kinds of cancer in people. Evidence is beginning to accumulate that CRP may also be elevated in dogs with several kinds of cancer (3rd & 4th abstract link), but high CRP can also be caused by infection, some autoimmune diseases, and many chronic diseases. Likewise, TKI can also rise for reasons other than cancer, such as viral infections and wound healing after trauma and surgery.

While some links to abstracts have been provided below for those who want more details, what all of this means is that there is definitely some scientific support for the claim that TKI and CRP

levels are often elevated in dogs that have certain kinds of cancer, primarily lymphoma and hemangiosarcoma. What it does not mean, however, is that there is scientific evidence indicating that TKI and CRP levels are elevated in "apparently healthy" dogs prior to the onset of other signs of cancer (a group that VDI targets for its INCaSe test). As of this writing (February 2012), there are no published peer-reviewed studies that have examined this question.

However, the study reported in the link to the first abstract measured TKI levels in dogs with lymphoma that had been treated with chemotherapy and were in remission. Investigators found that high TKI levels at the time of diagnosis generally returned to normal during remission, and then rose significantly by three weeks prior to relapse. They concluded from this study that TKI could be used to predict recurrence of disease several weeks prior to clinical signs, and this is very similar to the way that TKI testing is used in monitoring people with non-Hodgkin lymphoma.

Although there are no peer-reviewed data to support this next supposition, for the sake of discussion let's just say that an "early cancer detection test" might be able to predict LSA or HSA in a healthy dog in advance of clinical signs. Or maybe some owners will just be interested in trying a test out of curiosity. So let's examine a couple of likely scenarios of what might happen if the result comes back "positive" on a well-dog screening test.

In the first scenario, the owner of course is worried and upset, and sets forth on a mission to find cancer. It is very likely that the owner will want further testing to be done, which may include ultrasounds, radiographs, blood panels, and maybe even an MRI. And at the end of all that, the owner has spent quite a bit of money and nothing was found. Without a specific disease to treat, the owner then just worries and waits for cancer to show itself clinically, and nothing useful was gained. A good case could be made that it would have been better not to have done a screening test, and instead of wasting resources chasing a diagnosis that wasn't yet detectable, wait until cancer becomes clinically evident (if it ever does – some results will be false positives). Those resources could then be spent on treating the dog if that is the owner's choice.

In an alternate scenario, prompted by a positive "early cancer detection test," an abdominal ultrasound does indeed find a splenic mass. Although the test cannot tell for certain whether the mass is hemangiosarcoma or perhaps a benign hematoma, let's go with the worst case and say it's HSA and the dog has a splenectomy. Has anything been gained for dogs in which a tumor is discovered as a result of a positive screening test? Well, providing that the tumor is in an operable site, it's true that the dog will not suddenly collapse and die unexpectedly, and that is certainly important to the very small percentage of owners whose dogs will fit this circumstance. Sadly, however, the deadly course of the disease will not have changed, because **early detection has never been shown to improve outcome with regard to ability to achieve remission, duration of remission, or overall survival time in either lymphoma or hemangiosarcoma.**

Further, if, for example, TKI values can only predict disease a few weeks in advance of clinical signs (as research indicates to be the case in detecting lymphoma remissions) – and since HSA is an extremely rapidly developing disease -- there is probably only a very narrow slice of time in which the above scenario will apply. And indeed, VDI's own interpretation of a Negative result on their test states that the dog is at "low risk of major neoplastic disease in the next several months," which appears to acknowledge that there is only a short window of time during which test results might be meaningful.

(continued on page 4)

## EARLY CANCER DETECTION TESTS: (CONTINUED)

## MAF PROGRESS REPORTS (CONTINUED)

**Reframing the Question**

So where does this leave us? Unfortunately, for the vast majority of owners whose dog receives a positive result on an "early cancer detection test," there will be nothing whatsoever that they can do to improve their dog's outcome based on having had the test. For this reason, some scientists who have developed other methods of early detection -- as well as many clinical general veterinarians and oncologists -- consider it questionable to promote or offer these kinds of cancer predictive tests. And let's come back to the case with humans, in which much more is known about TKI testing. TKI testing in humans is not used as a widespread or even targeted (to high-risk populations) screening test to predict lymphoma. Why? For the same reason -- it does not improve outcome.

In discussing a test marketed by another company (OncoPet Diagnostics, Inc. -- who's disclaimers also certainly raise some concern with this test) for the early detection of cancer in dogs, board certified veterinary oncologist Dr. Timothy Rocha noted in an online article, "It's made by a company that is out to make a profit so, of course, they want as many people to use their product as possible. The problem arises when people who love their pets feel the need to go on a 'cancer hunt,' subjecting their animals to a lot of unnecessary diagnostic testing that can actually stress your pet and cost owners thousands of dollars. Owners want to do what is best for their animals, but this type of testing doesn't always amount to a positive for your dog."

Now, all that said, there may indeed be a more useful way to apply TKI testing, and this is beginning to find its way into oncology practices. TKI levels may be monitored during remission in dogs that have been treated with chemotherapy for lymphoma, following the model of a similar use in humans. Levels that remain high or become high during remission may indicate the need for more frequent follow-up intervals, so that rescue protocols can be initiated at the first sign of relapse. There is also some evidence to suggest that high TKI levels prior to therapy correspond to significantly shorter survival time (first link). However, for a number of reasons, it does not appear that this is currently in widespread use to predict response to therapy or duration of remission.

In summary, owners must decide for themselves and in consultation with their veterinarian whether any of the early cancer detection tests make sense for their dog in their individual circumstances. But as one considers the science behind and the value of tests marketed for the early detection of cancer, the initial question of "Does it really work?" should perhaps be reframed into the more relevant "Will it benefit my dog?"♦

**By Rhonda Hovan, Research Facilitator, GRCA**

**LINKS TO ABSTRACTS:**

J Vet Intern Med. (<http://tinyurl.com/d7t8sd7>)

2004 Sep-Oct;18(5):696-702.

**Serum thymidine kinase activity in dogs with malignant lymphoma: a potent marker for prognosis and monitoring the disease.**

Vet Comp Oncol. (<http://tinyurl.com/bvogdgg>)

2011 Oct 20. doi: 10.1111/j.1476-5829.2011.00298.x. [Epub ahead of print]

**Elevated serum thymidine kinase activity in canine splenic hemangiosarcoma(\*)**.

Vet Clin Pathol. (<http://tinyurl.com/buyztlr>)

2009 Sep;38(3):348-52. Epub 2009 Apr 16.

**Evaluation of serum haptoglobin and C-reactive protein in dogs with mammary tumors.**

Vet J. (<http://tinyurl.com/8g3sd8t>)

2007 Jul;174(1):188-92. Epub 2006 Aug 9.

**Changes in C-reactive protein and haptoglobin in dogs with lymphatic neoplasia.**

(Continued from page 2)

**DI2CA-026 Development of a CD20-Specific Antibody Fragment for Targeted Therapy of Canine B-Cell Lymphoma**

Nicola J Mason, BVetMed, PhD

University of Pennsylvania

**Progress Report:** Lymphoma affects approximately 30 of every 100,000 dogs. Current treatment consists of a combination of chemotherapy drugs, which induces remission in about 75 percent of patients. However, most dogs relapse within six to nine months of diagnosis. Rituximab, an antibody-targeting drug, has substantially improved survival times for people with various types of B-cell lymphoma. However, rituximab cannot be used in dogs because it is a human antibody and will therefore be rapidly destroyed by the dog's immune system. Furthermore, rituximab does not recognize or bind to canine B cells. Funded by Morris Animal Foundation and co-sponsors such as the **PWDF**, researchers at the University of Pennsylvania are developing a novel system to identify canine-derived antibody fragments similar to rituximab that will recognize canine cancer cells. In the first phase of the study, researchers are isolating canine derived, antibody fragments from "libraries" of antibody fragments. In order to begin screening these libraries for candidate fragments, researchers have generated target cells that express a specific canine B cell surface molecule, the same surface molecule that rituximab targets in humans. They are in the process of cloning these cells for use in their screening tests. Antibody fragments in the libraries that bind tightly to these cells will then be candidates for further study. Development of a canine-derived antibody fragment may allow targeted delivery of cell-killing agents to the malignant B cells, thereby allowing for increased chemotherapy doses, reduced side effects and improved outcome for dogs with B cell lymphoma.♦

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To include us in your estate plans, please use the following language: **Portuguese Water Dog Foundation, Inc., is a nonprofit 501 (c) (3) under Delaware law with its principal business address at:**

**P. O. Box 203, Parker Ford, PA 19457-0203**

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The Portuguese Water Dog Foundation, Inc.  
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The Portuguese Water Dog Foundation, Inc. needs your help and support to fund research to improve the quality of life and health of our Portuguese Water Dogs. Your **tax-deductible** donation, **in any amount**, would be greatly appreciated. In addition to personal donations, a donation may be made in memory or honor of a friend or loved one, whether human or canine. Donors' names will be kept anonymous upon request.

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Tear Here

# In Memory of... In Honor of... Thank You... Congratulations!

Looking for reasons (or excuses) to support the PWD Foundation and health research throughout the year? You can show your support and at the same time acknowledge a human or PWD friend or family member. Send a donation to honor that friend or a memorial donation in the memory of a departed friend. The PWD Foundation will send a card embossed with our logo acknowledging your generosity to the person or family you designate. ♦



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## RESEARCH PROGRESS REPORTS *(Continued)*

ongoing efforts include defining the role of these distinct metabolic signatures on hemangiosarcoma multipotency.

Data pertaining to aim 2 - how small molecule inhibitors that act directly and indirectly on angiogenic pathways affect HSA cells derived from dogs of each of these breeds. We reported previously on our work evaluating the effect of endothelin receptor and VEGF receptor inhibitors and the potential to use VEGF, EGF, and urokinase (uPA) as targeting agents for hemangiosarcoma. We also have evaluated the role of IL-8 (as part of a separate AKC CHF-funded project). We have considered additional molecules that may be critical for hemangiosarcoma growth and development, and specifically CSF-1R, CD44, CXCR4, and CXCR7 among others. We have generated CSF-1 on a hemangiosarcoma background and have generated the tools to knockdown CXCR4 and CXCR7. We also have obtained compounds to inhibit these molecules biochemically (neutralizing antibodies and small molecules). The main test we plan to use to assess the importance of these molecules is the serial sphere forming assay test, although we also will examine phenotypic and functional differences in the cells. We anticipate that formation of non-adherent spheres that retain multipotency will be the best surrogate to assess the possible role that these molecules play on intrinsic differentiation in vivo, although specific in vivo assays will be needed to establish microenvironment interactions. Data pertaining to aim 3 - examine how attenuating vascular endothelial growth factor receptors affects pro-inflammatory environments generated by HSA cells. Our data show that hemangiosarcoma cells are extremely resistant to >1,000 biologically active compounds (LOPAC library), with  $\mu\text{M}$  concentrations required to achieve any meaningful cytotoxicity. The efforts from this aim are redirected to evaluating compounds that affect pathways enriched in hemangiosarcoma stem cells, principally NFkB. Value added - we are fortunate to be able to enhance the objectives of this grant by creating synergy among multiple projects. Each project has a specific focus and is carefully managed to ensure there is no budgetary overlap. Yet, we have used these various and complementary, non-overlapping funding sources to develop a comprehensive program to study the biology of hemangiosarcoma. By leveraging these funding sources together, we can accelerate discovery R knockdown cells and CD44 knockdown cells and their impact, and build stronger collaborative relationships. ♦

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- GJJAMS Foundation – Glenda Schillinger
- GOOGLE
- The Portuguese Water Dog Club of Canada (PWDCC)
- Pouch Cove Portuguese Water Dogs

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- Colorado Portuguese Water Dog Club Water Trial Raffle in honor of all our amazing PWDs & in support of their future health & well being
- Sue Hopkins – Chulsa Kennels
- Roberta Knight in loving memory of Slippers & Lilly
- Overboard Portuguese Water Dog Club as a Thank You to Lauren McDermott for a great water workshop
- Heather, Rob & Berit Morrissey in memory of Bella
- The Portuguese Water Dog Club of the Twin Cities in memory of our PWDs who passed in 2011
- Marilyn Rimmer in memory of Walt Dalegowski, Claire Dignard, Lorraine Salerno, Darcy, Hardee & Ryan
- Jim & Jennie Wilson in memory of CH MACH Vindouro's Built To Withstand VCD2 RAE MXS MJC MXF

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- Keith & Marsha Litke – Covey Run PWDs
- Buffy Nicolas, Sandi Eisenstein & Puffy Mitchell in memory of Coach Bishop, most wonderful & big brother to Ref
- Pacific Northwest Portuguese Water Dog Club as a Thank You to Lauren McDermott for an inspiring water workshop & a great water trial
- Rio Salgado Portuguese Water Dog Club in memory of:
  - “Ana” - Madeira’s Miss Matched Socks
  - “Cyanus”
  - “Hardee” - CH MACH2 Vindouro's Built To Withstand VCD2 RAE MXF THD CWD GROM
  - “Pele” - MACH Sunnyhill Kinetic Wave of Pele VCD2 RN AXP MJP XF XFP
  - “Ryan” - CH Questars Rising Star of Orion WWD
  - “Sadie” - Legado Deusa de Ashbe RN AWD
  - “Teddy”
- Mark & Jill Roudebush
- Stan & Milarie Rude in memory of CH Timbermist Sorcerers Apprentis, “Mickey”
- Mike & Gloria Sullivan wishing a Happy Birthday to Bailey
- Kris Winkler in honor of Max Winkler

### Boatswain \$100-\$249

- Tim Abbott & Mariana Palacios in memory of Archie
- Ann & Jim Arens in memory of Anji's Robin Forever “Rags” 8/22/95-7/15/12 (littermate to Batman) lived happy & healthy with Betsy Ostermiller for 6 weeks shy of her 18th Birthday & never had an illness
- Ann & Jim Arens in memory of Anji's Denver 9/11/97-7/7/12 very much loved by the Phillips family & passed in his sleep just shy of his 15th Birthday with no health issues his whole life
- B Litter Grandkids in loving memory of AM CAN INT CH Timbermist Sorcerers Apprentis “Mickey”
- Debra Bender in memory of Hardee

**Boatswain \$100-\$249** (cont'd)

- Debra Bender in memory of CH Rough Seas' Estrela Da Lua OA AXJ OF AWD SROM
- Debra Bender in memory of "BRUXA" Rough Seas' Sea Witch, June 21, 2000-August 28, 2012
- Rough Seas' Sea Witch, June 21, 2000-August 28, 2012
- Peter & Cindi Boynton in memory of The Lambies Tango & Berto
- Chuck & Candi Bubert in memory of Terry Brunks, the classiest lady we have ever met!
- John & Diane Burke in memory of Sparky
- Chain O'Lakes Kennel Club in memory of Terry Brunks
- Gary & Karen Chapman as a Thank You to Anat Cunha & Karma Portuguese Water Dogs
- Julie Conger & Bruce Hoadley in memory of Barkeley Gouzee-Chow
- Alvaro & Ilse de Grandia in memory of "KC" - CH Benhill Kahula 'N Cream
- Wilma Diehl, Caroline & Mike Mozdean, Carol & Ron Harrison, Kathy Brown, Dianne Jamison, Ann Spitzer, Donna Monico, Wendy Doret, Douglas Moreland, Kit O'Donoghue, Judy Duck & Helena M in memory of Barbara Whitney
- Sarah Leatherman & Luna in memory of Gertie, beloved companion of Candi & Chuck Bubert
- Friends of Louise Mowbray & Rixa in honor of Louise Mowbray & VCCH Redwoods Sea Fox
- Friends of Splash Pratt in memory of "Splash" CH Cortereal Poseidon Adventure RN AWD 2AOM
- Vicki & Ken Goldberg in memory of Windruff Maggie Rae of Light
- Barbara Greenberg in memory of ANA a very "Special Girl"
- Paul F. Hancock
- Patty Johnson in memory of Terry Brunks
- Scott & Liz Kantor
- Otto A. Kuehne & Cynthia A. Kuehne in honor of Joan Bendure for cancer research
- Nancy Kurkjian in memory of Amigo's Mars MX MXJ XF CGC - 3 years ago Apr 9th
- Nancy Kurkjian in memory of HH Hardee - CH MACH2 Vindouro's Built To Withstand VCD2 RAE MXF T2B THD CWD GROM
- Alan & Haven Lane in memory of Rio Seco Tejo Seago
- Karen & Randy Latham in memory of Beau, Ivana, Allie & Chessie
- Merrill & Maya Liteplo in honor of Lisbon
- Warren Lloyd in honor of the PWD PSG
- Thomas & Linda Majcher
- Victoria Mature in memory of Bella
- Elona Meyer & Susan Straight in memory of Margo & Harry
- Candy, Cathy & Louise in memory of MACH Pele VCDI TD CDX CWD
- Anne M Murray in memory of Terry Brunks
- Nashville Dog Training Club Inc. in memory of Barbara Whitney
- Members of the Nutmeg Portuguese Water Dog Club in memory of Thomas A. Riley
- Members of the Nutmeg Portuguese Water Dog Club in memory of Barbara Whitney
- Pacific Northwest Portuguese Water Dog Club in memory of Laird Philbrick
- Rick & Stephanie Post in memory of Terry Brunks who loved dogs so dearly
- Diana Potenza in memory of my beloved pet Saltydawg Sail Away, Jib
- Susan & Win Priem in memory of Pat Qvigstad
- Bill & Marlene Rebello in memory of Tigo, our wonderful boy.
- Janine Richter & Tony Patton in honor of Puddles
- Jaime Rubinson in memory of Daisy
- Stan & Milarie Rude in memory of Haggapotamus, The Gentle Soul
- Victoria Shulman wishing a Happy Birthday to Benji
- Dennis & Fran Slutsky
- Southern California Portuguese Water Dog Club in memory of:
  - Duckie - Turnabout Just Duckie - Duckie
  - Friday - Finisterra's Brilliant Disguise
  - Hardee - CH MACH2 Vindouro's Built To Withstand VCD2 RAE MXF T2B THD
  - Lyndy - Piedelai Girossol de Legado AX OAP OAJ OJP WWD
  - Madison - CH Lisbons Praia de Ipanema CD RE WWD BROM

**Boatswain \$100-\$249** (cont'd)

- Karin Stalnaker-Spaan & Richard Stalnaker in honor of the PWD PSG
- Ken & Caren Stanley in memory of Seltzer & Splash
- Ken & Caren Stanley in honor of Gilligan & Gulliver
- Susan Straight & Elona Meyer in memory of Margo & Harry
- Barbara Stratton & Folly with love in memory of Zeep
- Richard Sweet in memory of our Portuguese Water Dogs, Darcy, Lizzie & Wylie
- Irwin Tobman in memory of Moby
- Edward B. & Daphne L. Wagnon
- Janet Warnsdorfer - Galaxy PWDs in loving memory of a great pet, Galaxy's Playing with Fire, CD RA NA AWD (Sinda)
- Jodi Whetzel & the Aspencove Crew in memory of CH Timbermist Sorcerers Apprentis
- Jim & Jennie Wilson in memory of Sweet V - MACH Finisterra's Wild Irish Rose CDX RE MXS MJS
- Penny Yamamoto in memory of Maggie, Brinee, Boo & Quila

**Sailor \$50-\$99**

- Dorothy Abbott in memory of Celeste
- Anonymous in memory of Liv
- Karen, Jim & Melly Ash & the Saltydawg PWDs in loving memory of Saltydawg Singing in the Rain - Nimbus
- Cathy Clouser Baker in memory of Dot, the smartest & cutest Portuguese Water Dog ever!
- Julie Bollinger in memory of Dicey & Revo & in honor of Tammy
- Mary Jo Burgess
- Ann Camp in memory of Baer Bach Kenai Calypso - my dear sweet Caly
- Ann Camp in memory of Laird Philbrick
- Linda Carey in memory of Claire Dignard
- Colorado Portuguese Water Dog Club in memory of Victor Di Leo (COPWDC member)
- Julie Conger in honor of the PWD PSG
- Phyllis Crane in memory of Jiggs & Archie, my 2 beloved PWDs
- John & Susan Cucura in memory of CH MACH2 Vindouro's Built To Withstand VCD2 RAE MXF T2B THD - Hardee
- Michele & Greg Dabal in honor of Benhill's Cody Jet
- Jeanne Danhauer in memory of Terry Brunks
- Scott & Jean Delorme in memory of Claire Dignard
- Bill & Judy Desana
- Carroll F. Dinning
- Chris & Steve Dostie in memory of UJJ CH Hunter's Dr. Seuss On The Loose CGC Jr.DSA DSA WWD "Zeep"
- Angelika Ebenig in honor of the PWD PSG
- Paul & Fran Fehling
- Herb & Jeri Foster in memory of Captain our first PWD
- Verne Foster in honor of the PWD PSG
- Jane & Stu Freeman in loving memory of CH Rough Seas Estrela Da Lua OA AXJ OF AWD SROM, we miss your smiling face
- Mike & Robin Gard in memory of Lucky Baker
- Peter Gardner & Patty Smith in honor of "Atticus"
- Vicki Goldberg in honor of the PWD PSG
- Stephanie Graf in honor of Aspencove's Break Your Heart
- Valerie Grahn
- Jean Howard in memory of Claire Dignard
- Rebecca and James Hynek
- Johnson Trio in loving memory of AM CAN INT CH Timbermist Sorcerers-Apprentis "Mickey"
- Johnson Trio in memory of John E. Gilmore
- Linda E. Keel
- Ralph & Karla Klump in memory of Abby
- Patricia & Kenneth Krushel
- Kuntz-Romanoski Family (Rio Rochoso) in honor of PWD PSG
- Bobbe Kurtz in memory of Elinore-Laird-Philbrick
- Jean & Larry Lejeune
- Little Fort Kennel Club of Waukegan in memory of Terry Brunks
- Kathy Maguire in honor of the PWD PSG

**Sailor \$50-\$99 (cont'd)**

- Tom & Tina March
- Paula & Joe Markiewicz, Dandelion Farm
- Pam Marshall in memory of HIT CH Pennrico Hytyd Azeitona UD RN AX AXJ CWDX GROM "Livvie"
- Bryan & Nancy Martin in memory of Terry Brunks "Our condolences to the family of Terry Brunks", a wonderful PWD Supporter!
- Bob & Adina Mathewson in honor of the PWD PSG
- Carol Mattingley & Ann Bowley in memory of Warren Warnsdorfer
- Leslie McCracken EAUCHIEN PWDs in honor of the PWD PSG
- Eugene & Lynn Means in memory of Obie & Sadie, beloved PWDs!
- Mary Ann & Brian McGunigle in memory of Barbara Whitney
- Toni & Harry McHugh as a Happy Birthday to Jaxx
- Kevin & Roxanne Murray in memory of Theresa E. "Terry" Brunks
- Janice Neefe in memory of Claire Dignard
- Jill Noon in memory of Theresa Brunks
- Beryl Nord in memory of CH Lake Breeze Nautilus Captain Nemo UDX RN NA NAJ WWD
- Obedience Stewards Club in memory of Barbara Whitney
- Sandy Otchet
- Joyce Polak & Barbara Williams in memory of a true Lady, Claire Dignard
- Carole Prangley-Mclvor in memory of Thomas A. Riley beloved husband of Deborah Lee-Miller Reilly
- Angie Robinson in honor of the PWD PSG
- Stan & Milarie Rude in memory of Tom All
- Stan & Milarie Rude in memory of John E. Gilmore, Kathy Bumiller's Dad
- Stan & Milarie Rude in memory of Terry Brunks
- Stan & Milarie Rude in memory of CH Sweetmeadow's Bugle Boy, "Boogie"
- Martha Ruskai in honor of the PWD PSG
- Saltydawg PWDs – Karen & Jim Ash in memory of CH Sweetmeadows Bugle Boy (Boogie)
- Saltydawg PWDs – Karen & Jim Ash in memory of, with love, Saltydawg Sail Away (Jib)
- Saltydawg PWDs – Karen & Jim Ash in memory of Saltydawg Reaching for the Starzz (Star)
- Mary Salvary in honor of the PWD PSG
- Anna & David Samuelson in honor of Isabella Da Ria Formosa's First Litter of 10 Puppies
- Ellen Sard in memory of their beloved buddy, Jasper
- Susan Schlitt in memory of Theresa "Terry" Brunks
- Charles & Marge Schreiber in memory of Warren Warnsdorfer
- Jerry & Mary-Kay Schroeder in memory of Terry Brunks
- Pam Wilson Selvig as a Thank You to Elaine Suter for my amazing & fantastic dog – Deke
- Tracy, John & Tory Stahl
- Sheila Susman in memory of Hardee
- Martha Thomas in honor of the PWD PSG
- Scott & Debbie Totten in memory of CH Kahula 'N Cream - KC
- Janet Warnsdorfer - Galaxy PWDs in memory of Galaxy's Heat of the Night (Star)
- Barb Weisman & Ed Geibert
- Margaret P. White in memory of Tom Greer
- Elana Winsberg & Family in memory of our beloved Tinker
- Jerry & Kim Wolcoveick in memory of Alice Vicha, "Frannie" & all the other Norvic PWDs waiting at the Rainbow Bridge

**DECK HAND up to \$49**

- Paula Adamson
- Michelle Allard in memory of Claire Dignard
- Ginny Anziani, Rolissa Nash & The Doggie "U" Team in memory of Barbara Whitney
- Jennifer & Mike Bauer in memory of UJJ CH Hunter's Dr. Seuss On The Loose CGC Jr.DSA DSA WWD "Zeep"
- Joyce & Dennis Bolden in memory of Claire Dignard
- Susan Boltinghouse
- Kim & Mike Bonner in honor of Bobber
- Bill & Lucille Burmeister in memory of Fancy

**DECK HAND up to \$49 (cont'd)**

- Kathy Bumiller, Sweetmeadow's in memory of Tom All
- Marlene Bunch & Victor Di Leo in memory of Banon
- Pamela Coffeen in memory of Dudley S. Doright
- Kathy Coffey in honor & memory of Barbara Whitney
- Joan & Lee Corbani in memory of Barbara Whitney
- Meg DeFore as Congratulations on your new title to CH Torrid Zone R I MAX!
- Meg DeFore as Congratulations on your new titles, I'm always proud of my wild kids! Coal & Millie
- Meg DeFore as a Thank You to Tom & Judy Leather for helping my friends & I learn the basics of water training
- Meg DeFore in honor of the PWD PSG
- Miriam Goren in memory of Coffee
- Miriam & Kal Goren in memory of Tyne
- Jeffrey & Donna Greengoss
- Kathy Groschupf & Frank Baucom in memory of "Pele", MACH Sunnyhill Kinetic Wave of Pele VCD2 RN AXP MJP XF XFP
- John Haeger in memory of Piedad Allegretto Con Brio
- Sherry Hanen in memory of Madeiras Miss Matched Socks
- Ann Harper & Bogart in memory of Cheers
- Linda K & Krista K Hunt, Kalista PWDs in memory of "Callie"
- Kalista's Absolute Calhoun loved by the Seiler Family
- Linda K & Krista K Hunt, Kalista PWDs in memory of Emerans Jelly Bean Karavin & CH. Restora Garfunkel of Karavin loved by Marv & Karen Strassburger
- Linda K & Krista K Hunt, Kalista PWDs in memory of "Nautique"
- Kalista's Answer to Prayer loved by the Kiedrowski Family
- Linda & Krista Hunt, Kalista in memory of "Rubi" CH Kalista Caught Another Gem AWD loved by the Federer Family
- Linda K. & Krista K. Hunt, Kalista PWDs in honor of "Iggy" Kalista's It's All About Me TD AX MXJ WWD SROM on his MXJ
- Linda K. & Krista K. Hunt, Kalista PWDs in honor of "Iggy" Kalista's It's All About Me CD TD AX MXJ WWD SROM VCD I on his CD & VCD I
- Kerk Family in honor of Olive & Leah
- Norm & Sue Laflamme in memory of Claire Dignard
- Lydia Lajda in memory of Barbara Whitney
- Glenda Lane
- Dan & Odette Leclerc in memory of Claire Dignard
- Sue Levine and "the boys" in memory of Barbara Whitney
- Marlyn Lukov in memory of Barnegat
- Marta & David in memory of Pogo
- Carol Mattingley & Ann Bowley in memory of Blue
- Carol Mattingley & Ann Bowley in memory of Cheers
- Carol Mattingley & Ann Bowley in memory of Maggie
- MaryAnn L. Magee in honor of Dr. Cheryl Winchell Hoofnagle
- Mary lou Mckeone-Mallo in memory of Diva
- Mary lou Mckeone-Mallo in memory of Handsome Hardee
- Sharon Mullen in memory of Claire Dignard
- Judy Murray in memory of Barbara Whitney
- Paul & Gert Parent in memory of Claire Dignard
- Peggy Ann Perkins in memory of Finisterra's Wild Irish Rose "Viva"
- Saltydawg PWDs – Karen & Jim Ash in memory of Claire Dignard
- Saltydawg PWDs – Karen & Jim Ash in memory of Thomas A. Riley
- Charles & Marge Schreiber in memory of Viva, loved by John & Susan Cucura
- Kathleen Skeels as a big Thank You to Linda Hunt
- Andrea & Bob Sklenar in memory of U-UD Sweetbrier's Rowdy Cowboy UDX, Canadian CD, CGC
- Kathleen Souza in memory of CH Cortereal Mad Love
- Kathleen Souza In memory of CH Driftwoods Magic Thunderbird AWD NAJP CGC
- Kathleen Souza In memory of CH MACH2 Vindouro's Built To Withstand VCD2 RAE MXF T2B THD
- Robin Steinmeyer in honor of Rough Seas' St. Augustine Light CD NA NAJ RN RA
- Suffolk Obedience Training Club, Inc. in memory of Barbara Whitney
- Judith Wilbur
- Nisey Wilterding