

FidoCure<sup>®</sup>

# Improving Cancer Patient Outcomes

June 2022 Outcomes Data Compilation





Dear Doctors,

When the One Health Company, parent of FidoCure®, was founded in 2015, human cancer treatment had already included precision medicine and targeted therapies for over two decades. With the exception of one targeted therapy (Palladia), there was almost no data on the use of targeted therapy for canine cancer treatment.

Over the past four years since the launch of our FidoCure® precision medicine platform, we have been able to help veterinarians guide treatment of nearly 3000 dogs with cancer. Throughout that time, we have also been collecting outcomes data. Without such data, there is no feasible path to proving whether targeted therapies are an advisable, possibly preferable, treatment option for canine cancer.

What you have before you in this compilation are the initial results from analysis of our data. The included analysis is in varying stages of vetting — from submitted for publication, to presented at conferences, to preliminary results — but we hope you'll agree that the trends are clear: genomic sequencing and targeted therapy represent the biggest advancement for improved canine cancer outcome in decades.

We have enlisted some of the best minds in cancer genomics from the world's finest institutions to help us in this journey and we are proud that our collaborators — academic leaders in their fields — have corroborated our findings. In collaboration with these researchers, we will continue to work on this data and plan for peer-reviewed publications to be available in early 2023.

Friends — canine cancer care has barely changed in over 40 years and now we're on the precipice of a revolution. We know that change isn't easy and we have years of learning ahead of us, but based on our initial findings we're optimistic that conquering cancer is no longer a pipe dream. Genomics and targeted therapies have already transformed the diagnosis and treatment of cancer in people and we want to bring this transformation to veterinary medicine.

The future is bright and it depends on your continued support. We thank all of you who have allowed us to join your teams in the mission of treating dogs with cancer. We could not have done this without you.

**Gerry Post, DVM, MEM, DACVIM (Oncology)**

Chief Medical Officer

[gerry@fidocure.com](mailto:gerry@fidocure.com)

# Table of Contents

---

- Welcome Note ..... 2
- What is FidoCure®..... 4
- One Health Foundations ..... 5
- Outcomes
  - HSA ..... 6
  - Pulmonary Carcinoma..... 7
  - TCC ..... 8
  - Oral Malignant Melanoma ..... 9
  - AI Analysis..... 10
- Acknowledgments ..... 13
- Contact Information..... 15



# What is FidoCure®

FidoCure® is a precision medicine platform for dogs with cancer.

Precision medicine is an approach to healthcare that matches treatment based on personal characteristics of the patient, such as their genetic profile. FidoCure® brings this cutting-edge approach — commonly deployed in human cancer care — to canine cancer.

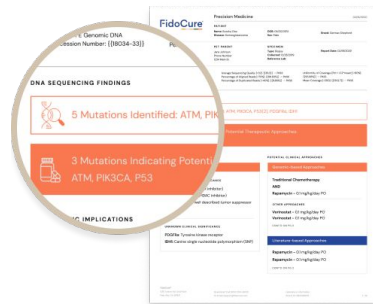
The FidoCure® NGS diagnostic genomically characterizes tumors and pinpoints targeted therapies using drugs that are FDA-approved for humans with dosages adjusted and compounded for canine patients by Wedgewood Pharmacy, the largest compounding pharmacy in the US. These targeted therapies are given orally at home by the family or caregiver.

Genomic sequencing can also provide prognostic information as well as help select between potential traditional chemotherapy classes.

For more information on incorporating FidoCure® at your clinic reach out and set up a lunch and learn: [lunch@fidocure.com](mailto:lunch@fidocure.com)



**1. Test**  
Tumor DNA



**2. Report**  
Actionable Mutations



**3. Treat**  
Targeted Therapies



**4. Data**  
Clinico-Genomic

# Foundations: Significant similarities in canine and human oncogenes

FidoCure® – the largest clinico-genomic canine oncology dataset:

- Validated by independent 3<sup>rd</sup> parties
- Shows many human and dog mutations are similar

This finding suggests that precision medicine designed for human oncology holds great promise for application to canine oncology.

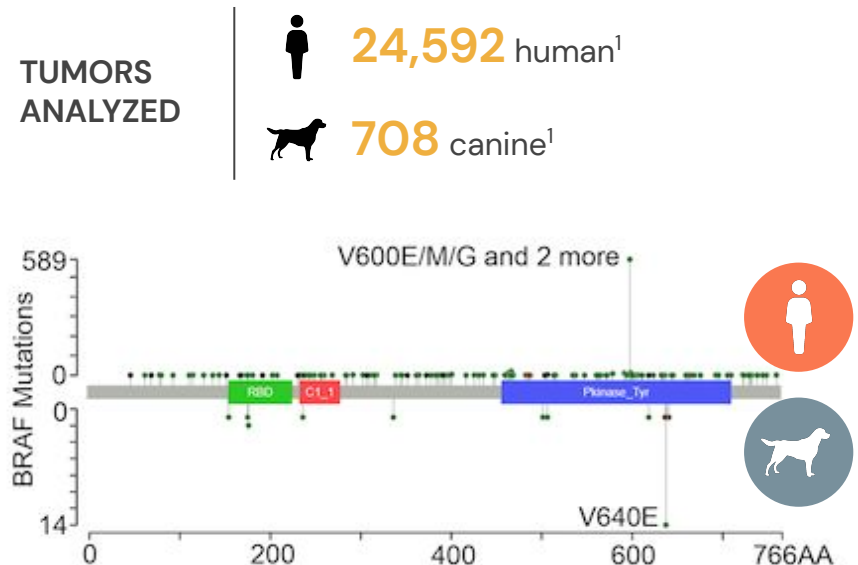
FidoCure® genomic results have been analyzed and validated by 3<sup>rd</sup> parties – **UG Cancer Center Dr. Zhao and scientists at the Broad Institute of MIT and Harvard.**

No other group has this 3<sup>rd</sup> party validation.

This research is in preprint and available on bioRxiv:

*Shared hotspot mutations in spontaneously arising cancers position dog as an unparalleled comparative model for precision therapeutics*

<https://doi.org/10.1101/2021.10.22.465469>



The amino acid sequence of the BRAF protein. A common mutations substitutions at position 600 in humans is analogous to a similar mutation in position 640. Similar analogous substitutions are found in other commonly mutated genes PIK3CA, KRAS, NRAS, KIT, ERBB2, and EGFR.

# Splenic Hemangiosarcoma

**Surgery + targeted therapy offers significant added MST over both surgery + doxorubicin and surgery alone.**

25% of dogs with HSA enrolled in FidoCure<sup>®</sup> are living **over 1 year**.

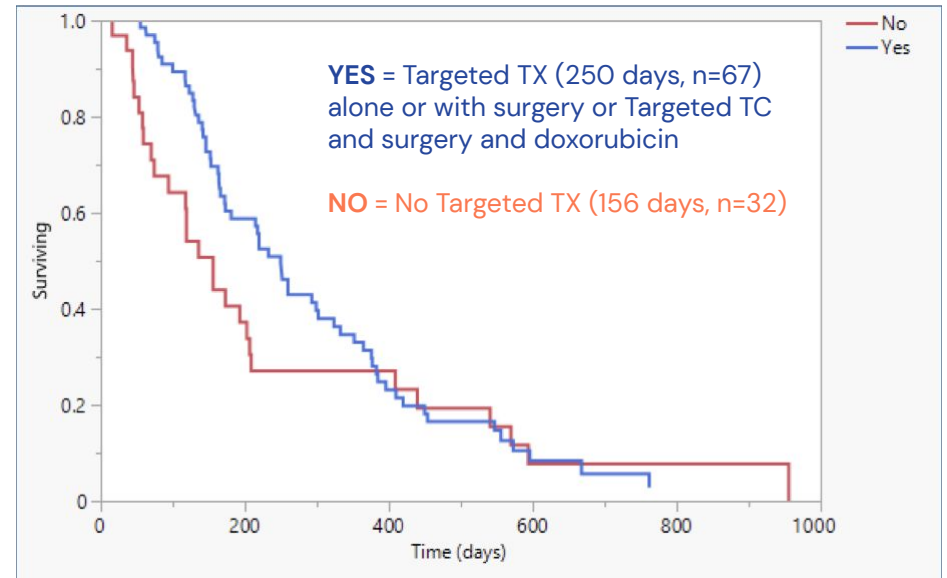
**Data:** FidoCure<sup>®</sup>

**Researchers:**

Dr. Timothy Estabrooks  
Dr. Cheryl London, Assistant Dean,  
Tufts Cummings School of Veterinary Medicine

**Presented at:**

Portions of this research were presented at VCS 2021



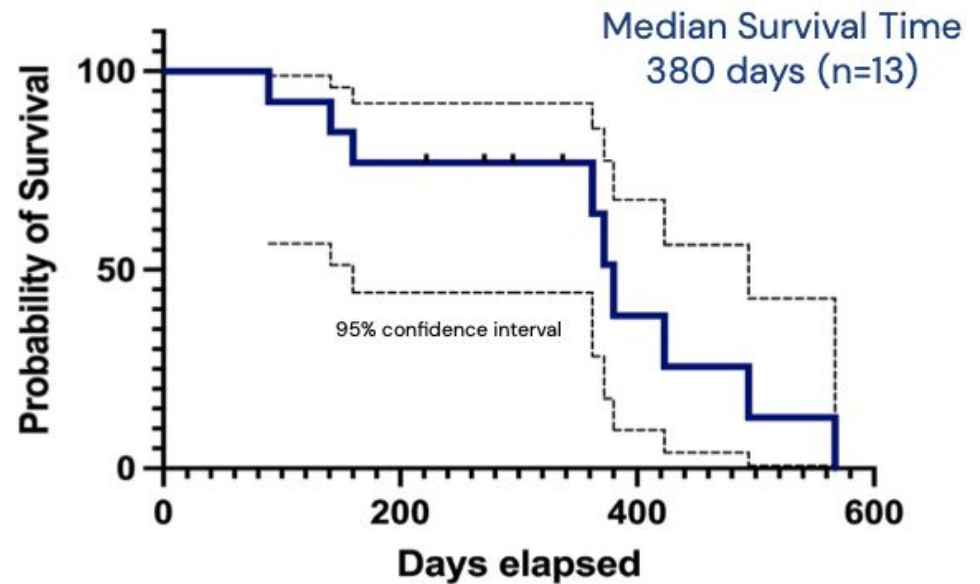
# Pulmonary Carcinoma

Lapatinib offers significant added MST for dogs with HER2 mutation and intermediate (grade II) to high (grade III) tumors.

Data:  
FidoCure®

Researchers:  
Dr. Lucas Rodrigues, PhD

Presented at:  
VCS Mid-year 2022



Survival times of dogs with pulmonary carcinoma treated with lapatinib based on FidoCure® genomic testing

FC	McNiel et al, 1997; Lee et al, 2020	
Grade II & III	Grade II	Grade III
<b>MST 380*† days</b>	MST 241-251 days	MST 5-43 days

\* Statistically significant compared to published literature

† Median time from diagnosis to start of lapatinib was 106 days

## OUTCOMES

# TCC/Urothelial Carcinoma

## Targeted therapy offers additional MST for dogs with TCC.

A combination of two targeted therapies plus traditional chemotherapy showed survival benefit compared to published MST with piroxicam alone.

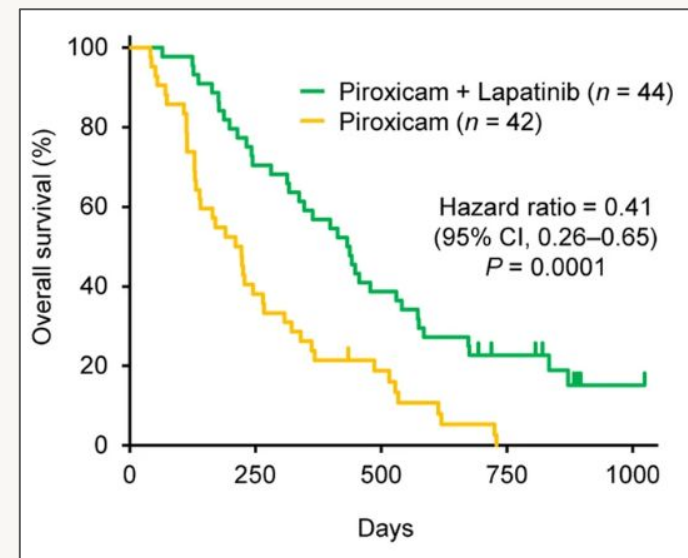
An independent published research from the University of Tokyo shows similar success with targeted therapies as first line treatment for TCC.

FidoCure® Preliminary TCC Data	
Piroxicam alone	Lapatinib + trametinib + chemo
MST 216* days	MST 425.5 days
* Maeda et al., 2022	

	Piroxicam	Mitoxantrone	Carboplatin	Vinblastine
# of dogs	n=42	n=26	n=24	n=28
Median Survival Time (days)	216	247.5	263	299

### Lapatinib as first-line treatment for muscle-invasive urothelial carcinoma in dogs

Maeda, S., Sakai, K., Kaji, K. et al. *Sci Rep* 12, 4 (2022). Nature, January 2022



### Maeda et al., 2022 Lapatinib

T2NOMO + lapatinib      T3NOMO + lapatinib

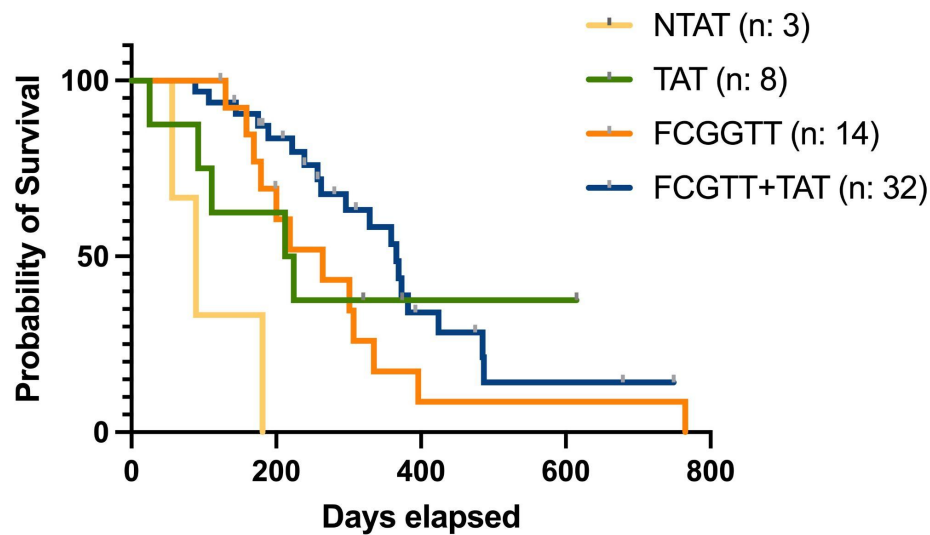
MST 409 days

MST 390 days

P = 0.0001 compared to Piroxicam only



# Oral Malignant Melanoma: Best MSTs seen with treatment that combines targeted therapy and traditional adjuvant therapy



4 dogs living > 365 days before FidoCure® treatment were not included in this analysis

Median Survival	
Non-traditional adjuvant therapy (NTAT)	89 days
Traditional adjuvant therapy (TAT)	<b>218 days</b>
FidoCure® guided targeted therapy (FCGTT)	<b>264 days</b>
FidoCure® guided targeted therapy + traditional adjuvant therapy (FCGTT+TAT)	<b>366 days</b>
P=0.0002	

## Best MSTs

Targeted therapy + traditional therapy: 366 days  
 Targeted therapy alone: 264 days

## AI: Analysis of Our Data

---

Artificial intelligence (AI) and machine learning enable scalable, independent, and objective analysis of all combinations of mutation, treatment, cancer type and outcome.

World-renowned Stanford researchers applied AI to the FidoCure® clinico-genomics dataset. Findings were presented at the AACR 2022 conference, the most important conference in human oncology.

### Key Highlights

- Clinical highlight: Specific mutations detected by the FidoCure® panel are correlated with better prognosis when treated with certain targeted therapies.
- Clinical highlight: Specific mutations detected by the FidoCure® panel are correlated with worse prognosis.
- **Utilizing FidoCure® NGS empowers oncologists to provide better prognostic information to pet parents.**

### Looking to the Future

Continuous reevaluation of our unique dataset using cutting-edge computational technologies enables FidoCure® to unlock insights with immediate clinical benefits to patients.

# AI analysis highlights the value of sequencing tumors to match the best targeted therapy

## Dogs are living longer with FidoCure<sup>®</sup> genomics-guided therapies.

- Tumors carrying non-silent germline and somatic **BRCA1 mutations** had a better prognosis when treated with **dasatinib**.
- Tumors carrying somatic **BRAF mutations** had a better prognosis when treated with **lapatinib**.
- Tumors carrying somatic **ARID1A mutations** had a better prognosis when treated with **trametinib**.

Gene	Targeted Tx	Hazard Ratio	MST Days (Tx group)	MST Days (Control)
BRCA1	Dasatinib	0.26	641	202
BRAF	Lapatinib	0.10	284	183
ARID1A	Trametinib	0.08	237	185

Hazard ratio <1 reflects a survival benefit vs. all other conventional therapies.  
A hazard ratio of 0.8 is considered a win in human oncology.

# Our Dx test has prognostic value

**Canine cancer biomarkers are correlated with patient outcomes.**

TP53 & PIK3CA are the worst prognostic markers for canine cancer in our datasets. This is concordant with human cancer prognostic markers<sup>1,2</sup>.

Gene	Hazards Ratio	95% CI	p-value	# Dogs (with/without)
TP53	1.56	(1.30, 1.86)	<0.01	397/711
PIK3CA	1.34	(1.03, 1.73)	0.03	129/979
ATM	0.54	(0.34, 0.84)	0.01	58/1050
NRAS	0.52	(0.35, 0.78)	<0.01	69/1039
KIT	0.44	(0.22, 0.89)	0.02	31/1077

1. Petitjean, A., Achatz, M., Borresen-Dale, A. *et al.* TP53 mutations in human cancers: functional selection and impact on cancer prognosis and outcomes. *Oncogene* 26, 2157–2165 (2007). <https://doi.org/10.1038/sj.onc.1210302>
2. Alqahtani A, Ayesh HSK, Halawani H. PIK3CA Gene Mutations in Solid Malignancies: Association with Clinicopathological Parameters and Prognosis. *Cancers* 12, 93 (2020). <https://doi.org/10.3390/cancers12010093>

# Thank you to our world-class Scientific Advisory Board for their guidance



**Amy Abernethy, MD, PhD**  
**Founding Advisor**  
 FDA Deputy Principal  
 Commissioner,  
 Flatiron CMO & CSO;  
 President, Verily  
 UPenn, Duke

## Cancer Genomics



### Dr. Elinor Karlsson

- PhD (Bioinformatics)
- Director of the Vertebrate Genomics Group, the Broad Institute of MIT and Harvard
- Darwin's Dog Founder & Chief Scientist



### Dr. Corrie Painter

- PhD (Biochemistry)
- Deputy Director, Count Me In, Broad Institute of MIT and Harvard
- Broad Cancer Program
- Angiosarcoma Advocate

## Human Translation



### Dr. Len Lichtenfeld

- MD, MACP
- (Former) Deputy Chief Medical Officer, American Cancer Society
- Advocate of spontaneous disease model



### Dr. Bruce Littlefield

- PhD
- Distinguished Scientist and Head Translational Medicine, Global Oncology at Eisai
- Leader in translational medicine

## Canine Cancer



### Dr. Gerald Post (CMO)

- DVM, MEM, Diplomate ACVIM (Oncology)
- Founder, Animal Cancer Foundation & Veterinary Cancer Center
- 30 years veterinary oncology practice, ran over 20 clinical trials



### Dr. Cheryl London

- DVM, PhD, DACVIM Onco.
- Tufts Veterinary School of Medicine & Medical School
- Chaired Prof, Comp Oncology
- Assistant Dean for Research

## AI + Immuno Oncology



### Dr. James Zou

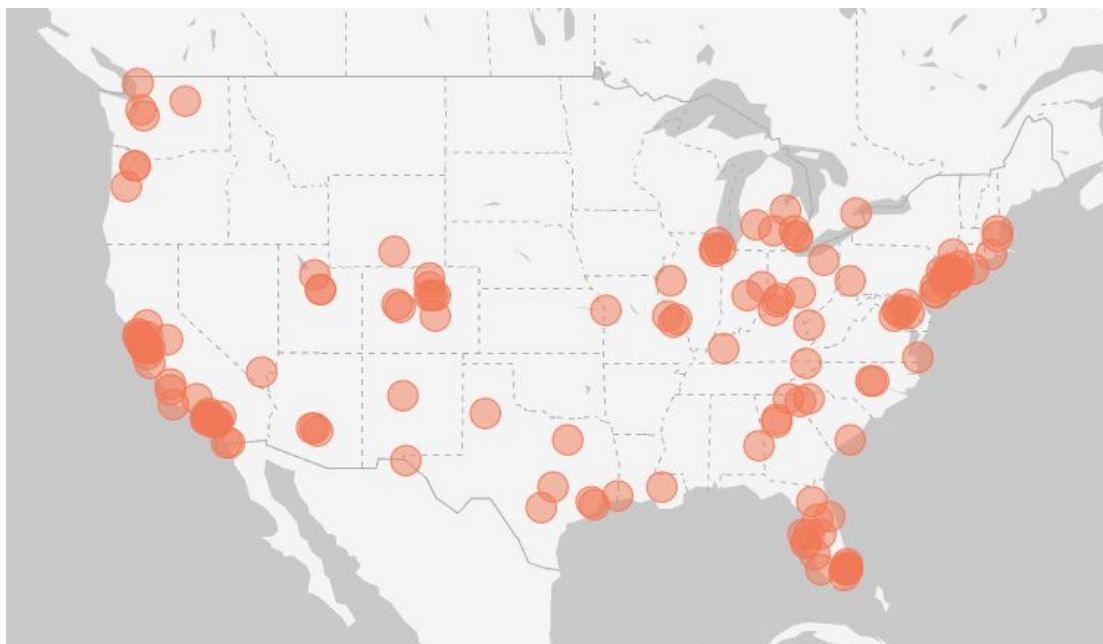
- PhD
- Stanford AI Lab
- AI leader in Bio
- AI applied to Flatiron/Foundation clinico-genomic data sets
- AI tools veterinary medical records to infer diagnosis



### Dr. Nicola Mason

- BVetMed, PhD
- Diplomate, American College of Veterinary Internal
- Professor, UPenn School of Veterinary Medicine

Thank you to all the  
doctors and their teams  
who submitted cases  
and shared outcomes



Nearly  
**3000**  
cases and counting

Over **60%** of US  
oncologists and  
over **350** specialty  
clinics already use  
FidoCure®

FidoCure<sup>®</sup>

## Get in Touch

To learn more about incorporating FidoCure<sup>®</sup> in your clinic, reach out to our clinics team and set up a lunch & learn: [lunch@fidocure.com](mailto:lunch@fidocure.com)

fidocure.com  
Improving Cancer Patient Outcomes

