Chand Khanna DVM, PhD

Diplomate American College Veterinary Internal Medicine (Onc.)
Diplomate American College Veterinary Pathology (Hon.)

Ethos Veterinary Health, Woburn, MA
Ethos Discovery, Washington, DC
Comparative Oncology

To provide opportunities to include NATURALLY OCCURRING CANCER MODELS in the study of cancer biology and therapy

Companion Animal Cancer Models
- Large outbred animals
- Strong genetic similarities to humans
- Naturally occurring cancers
- Immune competent and syngeneic
- Relevant tumor histology/genetics
- Relevant response chemotherapy
- No “Gold Standards”
- Compressed progression times
- Tumor heterogeneity/ EVOLUTION
- Recurrence/Resistance
- Metastasis biology

Expression Profiles for Canine and Human Osteosarcoma are Indistinguishable

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BMC Genomics 2009
Integrated and Comparative Cancer Drug Development: Ask questions ... or guess

Paoloni and Khanna
Comparative Oncology USA

Comparative Oncology Program (COP)

Comparative Oncology Trials Consortium (COTC)

Canine Comparative Oncology and Genomics Consortium (CCOGC)
Reagent/Resources to conduct studies in Comparative Oncology

- Genomics
- Proteomics
- Antibodies
- Biospecimen Repository
- PD Core
- Canine Comparative Oncology and Genomics Consortium

Advocacy for the Appropriate Integration of Comparative Oncology Trials

- Academia
- Pharma
- NCI
- Regulatory Bodies

Progress by the Comparative Oncology Trials Consortium (COTC)

- Initiated of Letters of Intent: 19
- Initiated study protocols: 11
- Studies completed: 9
- Studies published: 3
- Studies in progress/in press: 7

Studies of COTC are published under a “Collection” in PLoS One
Meeting

The Role of Clinical Studies for Pets with Naturally Occurring Tumors in Translational Cancer Research

When: June 8, 2015 - June 5, 2016 (8:00 AM Eastern)

Topics: Biomedical and Health Research, Diseases, Health Care Workforce, Health Services, Coverage, and Access, Quality and Patient Safety

Activity: National Cancer Policy Forum

Board: Board on Health Care Services
Activity for Drugs that Biologically Target Vulnerable Metastatic Cells: Comparative Oncology and Biomarkers

Toward a Drug Development Path That Targets Metastatic Progression in Osteosarcoma

Chand Khanna1,11,12, Timothy M. Fan13, Richard Gorlick14,15, Lee J. Helman11,12, Eugenie S. Kleinerman17, Peter C. Adamson19, Peter J. Houghton20, William D. Tap16, Danny R. Welch21, Patricia S. Steeg7,11,12, Glenn Merlino8,11,12, Poul H.B. Sorensen34,35, Paul Meltzer9,11,12, David G. Kirsch22, Katherine A. Janeway23,24, Brenda Weigel25, Lor Randall26, Stephen J. Withrow27, Melissa Paoloni3,11,12, Rosandra Kaplan2,11,12, Beverly A. Teicher10,11,12, Nita L. Seibel4,11,12, Malcolm Smith12, Aykut Üren28,29, Shreyas Kumar R. Patel18, Jeffrey Trent30, Sharon A. Savage5,11,12, Lisa Mirabello6,11,12, Denise Reinke31, Donald A. Barkauskas32, Mark Krailo33, and Mark Bernstein36
Precision (Personalized) Medicine for Cancer

Patient sample → Platform → Biologically Driven Drug → Combination with Conventional Therapy → Pharmacodynamic Tailoring

Patient sample

Platform

Combination with Conventional Therapy

Pharmacodynamic Tailoring

Biologically Driven Drug

Patient

Precision (Personalized) Medicine for Cancer
Canine Hemangiosarcoma: Biomarker and PMED Program: CHAMP

• 12 month longitudinal study of cancer evolution
Precision Medicine: Non-candidate drug matching

• Human Evidence:
  – The Biomarker-integrated Approaches of Targeted Therapy for Lung Cancer Elimination (BATTLE) I, 2011
  – I-SPY 1 TRIAL (Investigation of Serial Studies to Predict Your Therapeutic Response with Imaging and molecular Analysis, 2013)

• Canine Evidence:
  – Canine P-mediated feasibility reported
  – Randomized studies underway

• Commercial availability for human
  – Foundation Medicine and many others

• Commercial availability for Canine
  – (Innogenics, Diamond Back)

• Launch of clinical trials in dogs (Ethos, TGen, TOS)
  – Feasibility: completed
  – Evidence Trials: underway
  – CHAMP PILOT