From Bench to Bedside Via Veterinary Radiation Oncology:

Clinical Trials in Radiation Oncology

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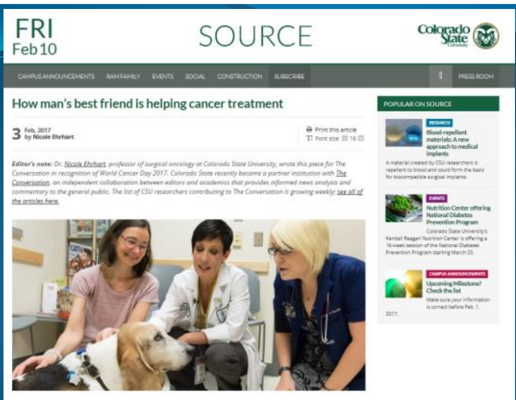
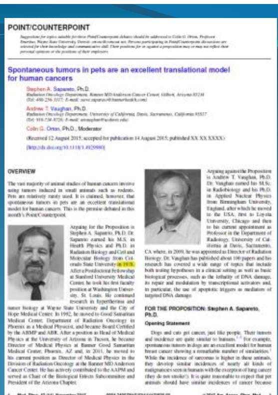
Aug 1, 2017





POINT/COUNTERPOINT

Spontaneous tumors in pets are an excellent translational model for human cancers

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OVERVIEW

The vast majority of animal studies of human cancers involve using tumors induced in small animals such as rodents. Pets are relatively rarely used. It is claimed, however, that spontaneous tumors in pets are an excellent translational model for human cancers. This is the premise debated in this month's Point/Counterpoint.

FOR THE PROPOSITION: Stephen A. Sapareto, Ph.D.

Opening Statement

Why are veterinary patients useful for human radiotherapy?

1. Pets get spontaneous tumors like humans.
2. For the most part, they have similar incidences of cancer compared to humans (with the exception of sarcomas and lung cancer).
3. Tumors are of comparable size to be treated by the same equipment as humans.
4. Due to shorter life spans, recurrence seems to occur within 2 years compared to 5 years in humans.

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The American Veterinary Medical Association (AVMA) database lists 254 canine clinical studies

- 3 Radiation trials (all SRT)
- 2 Radiation plus chemotherapy trials
- 2 Radiation plus immunotherapy trials

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Veterinary Radiation Therapy Oncology Group

The Veterinary Radiation Therapy Oncology Group (VRTOG) is a part of the American College of Veterinary Radiology (ACVR.ORG).

The Specialty of Radiation Oncology was created in 1994 and now has 54 Diplomates.

The VRTOG was formed in 2010 and There are currently 37 member sites participating.

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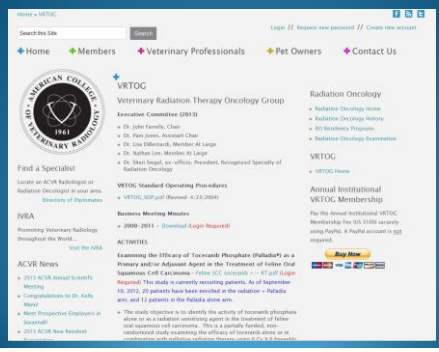

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The VRTOG has performed a number of clinical trials, some retrospective. Currently there are two prospective trials open.

Until now, most studies have investigated the combination of drugs with radiation for two reasons:

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Reasons for Drug/Radiation trials:

1. The availability of funding from pharmaceutical companies.
2. The differences in radiation protocols between animals and humans

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Why veterinary clinical trials are now more relevant:

- Historically veterinary animals got less than 15 fraction treatment, humans got 25-30 fractions
- Current trends in humans are for fewer fractions (SBRT) making veterinary protocols more relevant.

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Survey of sites (2016):

25 sites responded with 38 certified radiation oncologists
5 residency trained not yet certified
13 residents

17 linear accelerators
17 Varian
7 Siemens
2 Elekta
1 Accuray (Tomo)

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Survey of sites (2016):

All sites have electrons except 2 (a 4MV linac and Tomo)
25 sites have MLC's (14 have 120 leaves)
17 sites can treat IMRT (11 doing step and shoot)
8 are VMAT capable (2 others would need upgrades)
7 sites are IGRT capable (OBI)

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Survey of sites (2016):

Planning systems:

- 9 Pinnacle
- 9 Eclipse
- 1 Oncentra
- 2 Prowess
- 1 Raystation
- 1 Tomo
- 3 others

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Survey of sites (2016):
25 sites have onsite CT scanners
21 sites have access to MRI
Other therapies:

- 12 Sr-90
- 2 HDR
- 1 Xoft
- 14 I-131

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WGVRTOG

WGVRTOG Charge

- To survey existing VRTOG members to assess and determine resources and needs.
- To evaluate and provide guidance on the physics support needed by the VRTOG such as:
  - Defining and improving appropriate Quality Assurance processes, much like the NRG and IROC, to support clinical trials in veterinary patients including:
    - Need to establish a calibration verification process like IROC-Houston's OSLD/TLD output verification program for veterinary linear accelerators and ^{60}Co units participating in clinical trials.
    - Define situations where appropriate end-to-end QA phantoms may be valuable to demonstrate capability to participate in clinical trials (again similar to IROC Houston's phantoms).
    - Develop other auditing/credentialing processes of clinics participating in VRTOG clinical trials.
  - To act as a liaison between the VRTOG, AAPM and other organizations to provide medical physics resources and expertise.
  - To assist in preparation of grant applications to support Veterinary clinical trials by the VRTOG