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Mapping osteosarcoma risk factors in Irish Wolfhounds

Emma Ivansson, PhD

on behalf of the Canine Osteosarcoma
Genetics group





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We study dog genetics

- Uppsala University, Uppsala, Sweden
- Swedish Agricultural University, Uppsala, Sweden
- Broad Institute of Harvard and MIT, Boston, USA
- Animal Health Trust, Newmarket, UK





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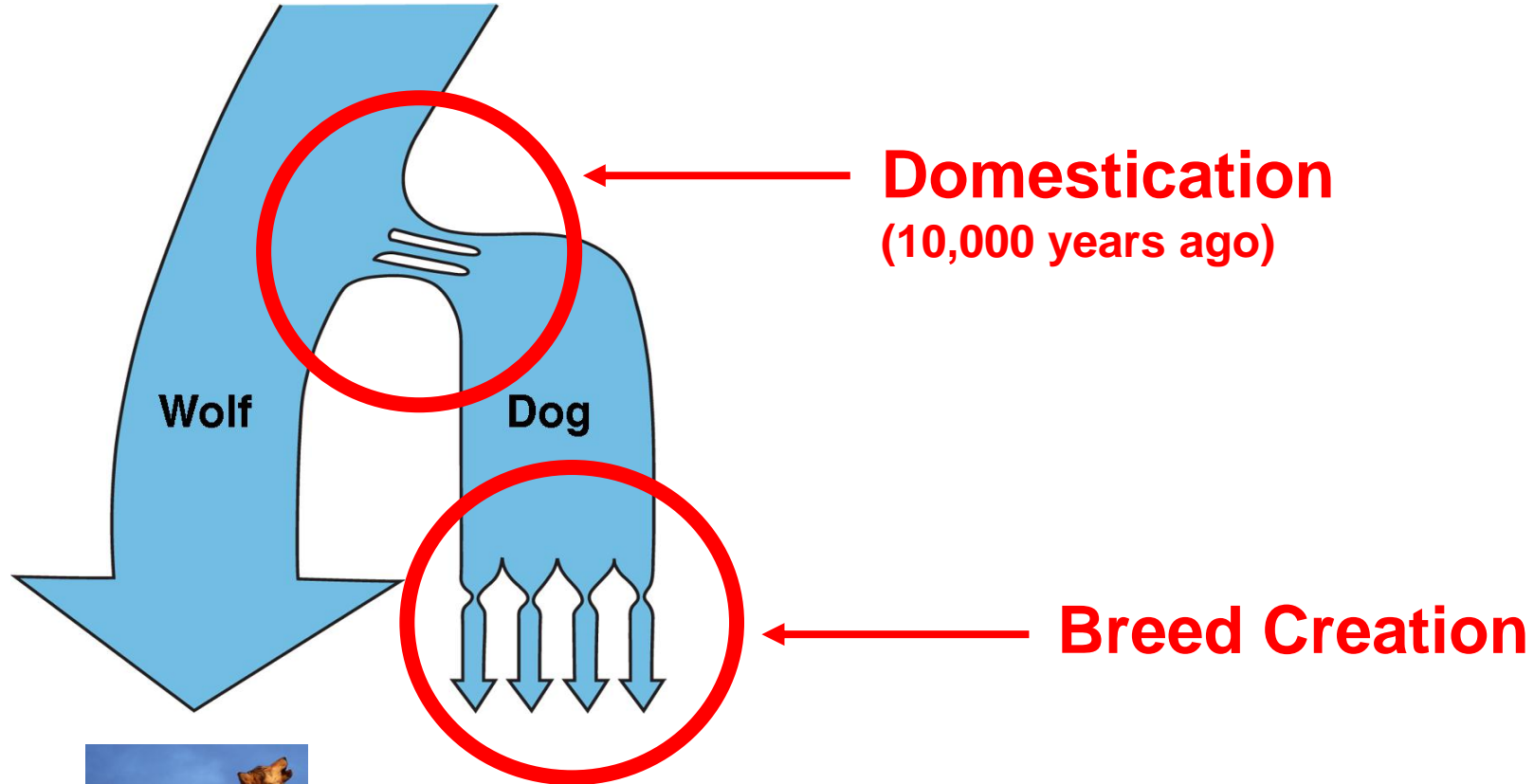
We aim to improve dog health

Finding the genetic risk factors underlying diseases help us understand the disease process





Dog genome shaped by history



Domestication
(10,000 years ago)

Breed Creation





Breeds are genetically isolated



Dog breeds show
extraordinary diversity

- Looks
- Physiology
- Behaviour

Dogs within a breed are
similar, including risk factors





Disease-gene mapping

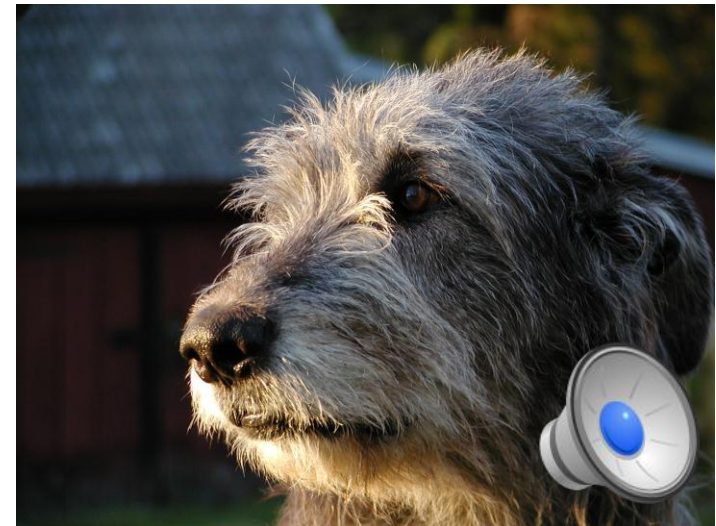
- Preparation phase
 - Identify predisposed breeds
 - Mode of inheritance?
 - Define "sick" and "healthy"
- Collect samples
- Whole-genome association analysis
 - look for regions of the genome that differ between sick and healthy dogs





Disease-gene mapping

- Find the actual risk factors and understand how they cause disease
- Use the knowledge to improve health
 - Therapies
 - Influence breeding





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Ongoing wolfhound projects

Osteosarcoma - bone cancer

- Uppsala
- Broad Institute
- Animal Health Trust



Dilated cardiomyopathy

- part of LUPA project
- analysis managed by Veterinary University in Hannover



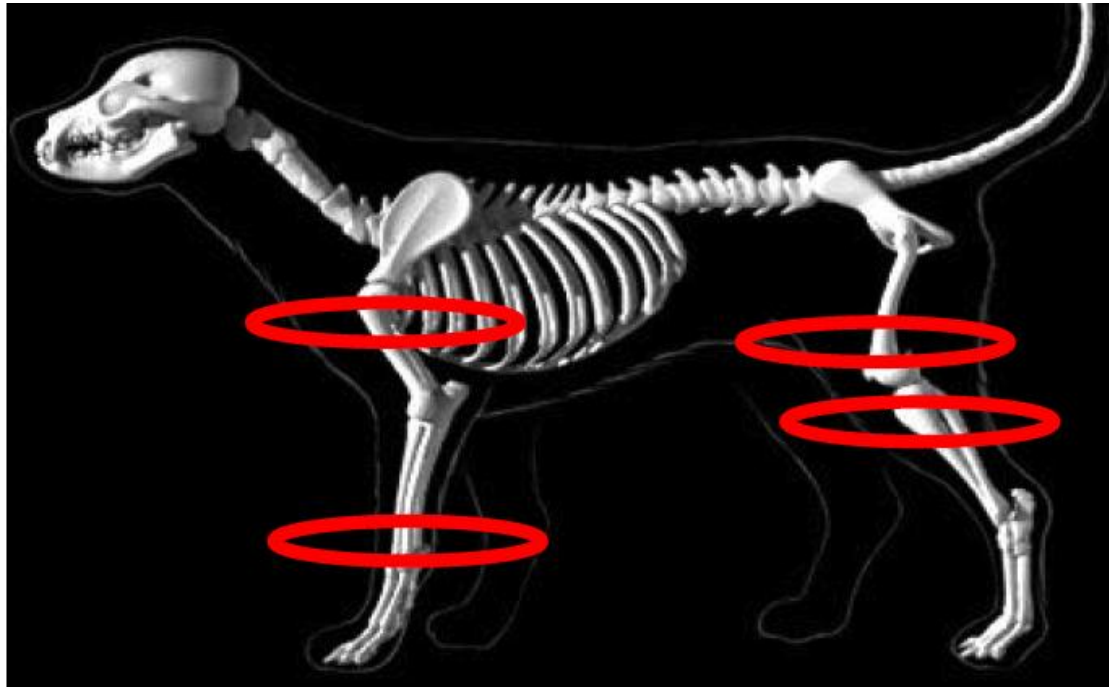


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Osteosarcoma - bone cancer

The most common bone cancer in dogs

Aggressive and fatal disease, spreads quickly





Breeds in the current study

Osteosarcoma affects large and giant breeds
Some breeds are at higher risk than others



~25%



~20%



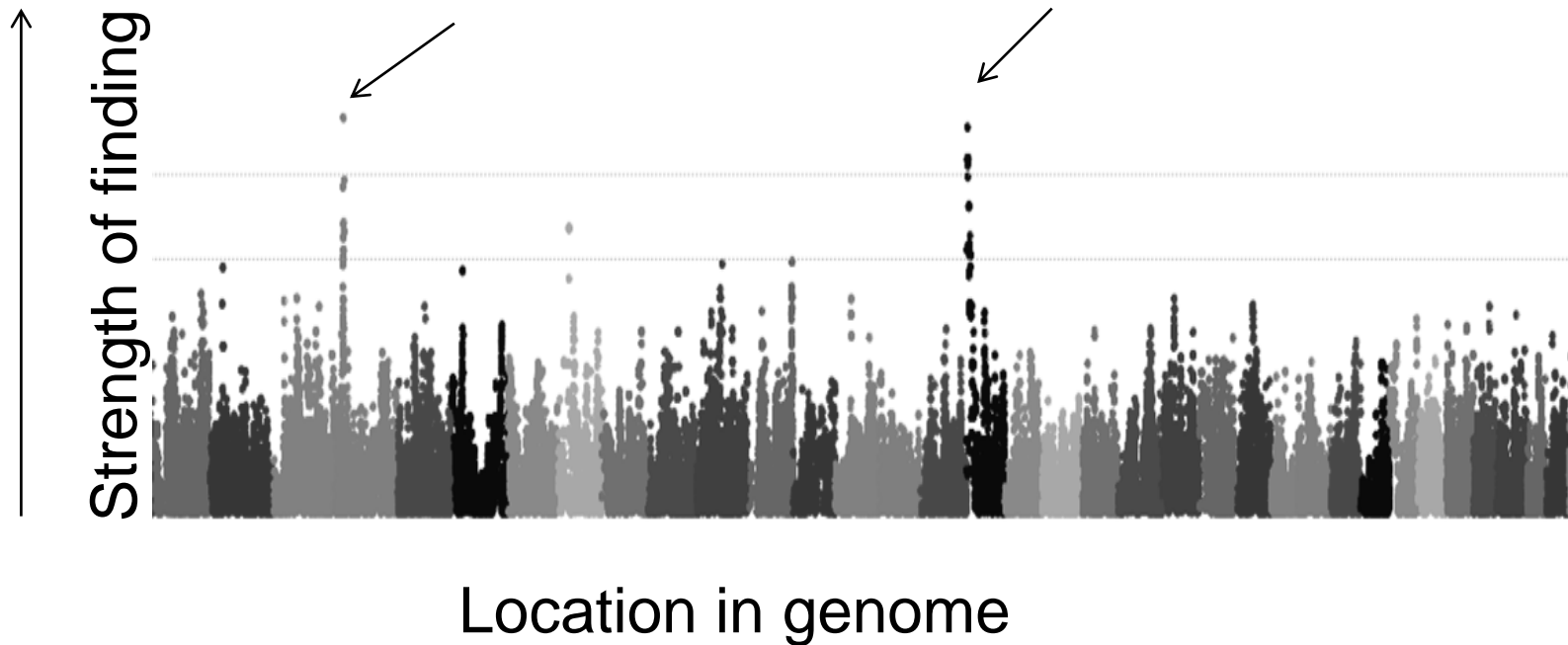
~15%





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Results from the analysis





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Next steps...

Find the disease-causing changes and evaluate how they affect the body

Investigate changes that occur during tumor development

Analyze more breeds to discover more risk factors





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Please keep helping us!

Currently looking for

- dogs with osteosarcoma
- Healthy - age 7 or older

Submit a blood sample:

- E-mail: hundbiobanken@slu.se
- Telephone: +46-18-672012



Another member of the international team working on osteosarcoma



Animal *Health* Trust
Oncology Research Group

**Genetic study on the
predisposition of Irish Wolfhounds
to developing osteosarcoma**



Submit a surplus blood sample OR request a cheek swab kit:

- By E-mail to oncologyres@aht.org.uk
- By telephone to +44 1638 751000 ext. 1214



Help future research into inherited diseases in Irish wolfhounds



SAMPLE SUBMISSION FOR IRISH WOLFHOUND DNA STORAGE PROGRAM



The Irish Wolfhound Health Group is working in partnership with the Animal Health Trust (AHT) to enable research into conditions affecting the breed. The AHT has agreed to store blood samples in order to provide DNA required for such research. We would urge breeders/owners to submit blood samples from their hounds in order that we may all benefit from this in the future.

Submit a surplus blood sample to the Irish Wolfhound DNA Archive

Contact the Animal Health Trust:

- E-mail: oncologyres@aht.org.uk
- Tel.: +44 01638 751000 ext. 1214



US collaborators for osteosarcoma

Jaime Modiano, University of Minnesota

Matthew Breen, North Carolina State University

Guillermo Couto, Ohio State University

In the US: Irish Wolfhound samples are collected at
the Broad

dog-info@broadinstitute.org





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Acknowledgements

Kerstin Lindblad-Toh



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Mike Starkey



Animal Health Trust



Irish wolfhound
Club of America



Iwane
founded 1934



CANINE HEALTH FOUNDATION

AMERICAN WOLF HOUND CLUB





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Thank you!!



<http://hunddna.slu.se/>
<http://dogdna.org>

