

TIBETAN TERRIER
World Congress
24 & 25 September

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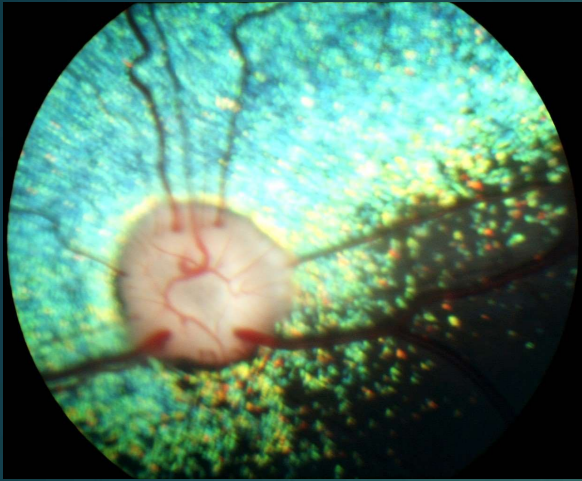
9h30 / 10h	Dr Gilles Chaudieu - Ophtalmologist - Dip ECVO Eye diseases : hereditary or not ?
10h / 10h30	Pr Jean Pierre Genevois - Orthopedist - Expert of the FCI scientific commission Normal hips : what are the criteria? .
10h30/ 10 h 45	Break
10 h 45 / 11 h 15	Fleur Marie Missant – SCC Health and Genetic Resources Project Manager: Genomics as an aid to diagnosis
11 h 15 / 11 h 45	Dr Daniel Combarros – Dermatologist – Professor at the Veterinary school of Toulouse Itching : understanding it, treating it, prevent it
11h45 / 12 h 30	Round table - Discussion

14 h / 14 h 40	Mark James / Glenn Davies : Tibetan terriers. A passion, knowledge and understanding.
14 h 40 / 15h 10	Dr Mike Tempest (Mikudi TTs, UK) : An analysis of the 2019 genetics paper and what it means for the breed
15h10 / 15h30	Break
15h30 / 16h30	Round table; standards and question about the breed : Brian Harris – Mike Tempest – Mark James - Sabine Schiratti - Lydie Estru – Gauthier Lequain



Dr Gilles Chaudieu
Ophtalmologist - Dip ECVO

**Eye diseases
hereditary or not ?**



Eye diseases: hereditary or not?

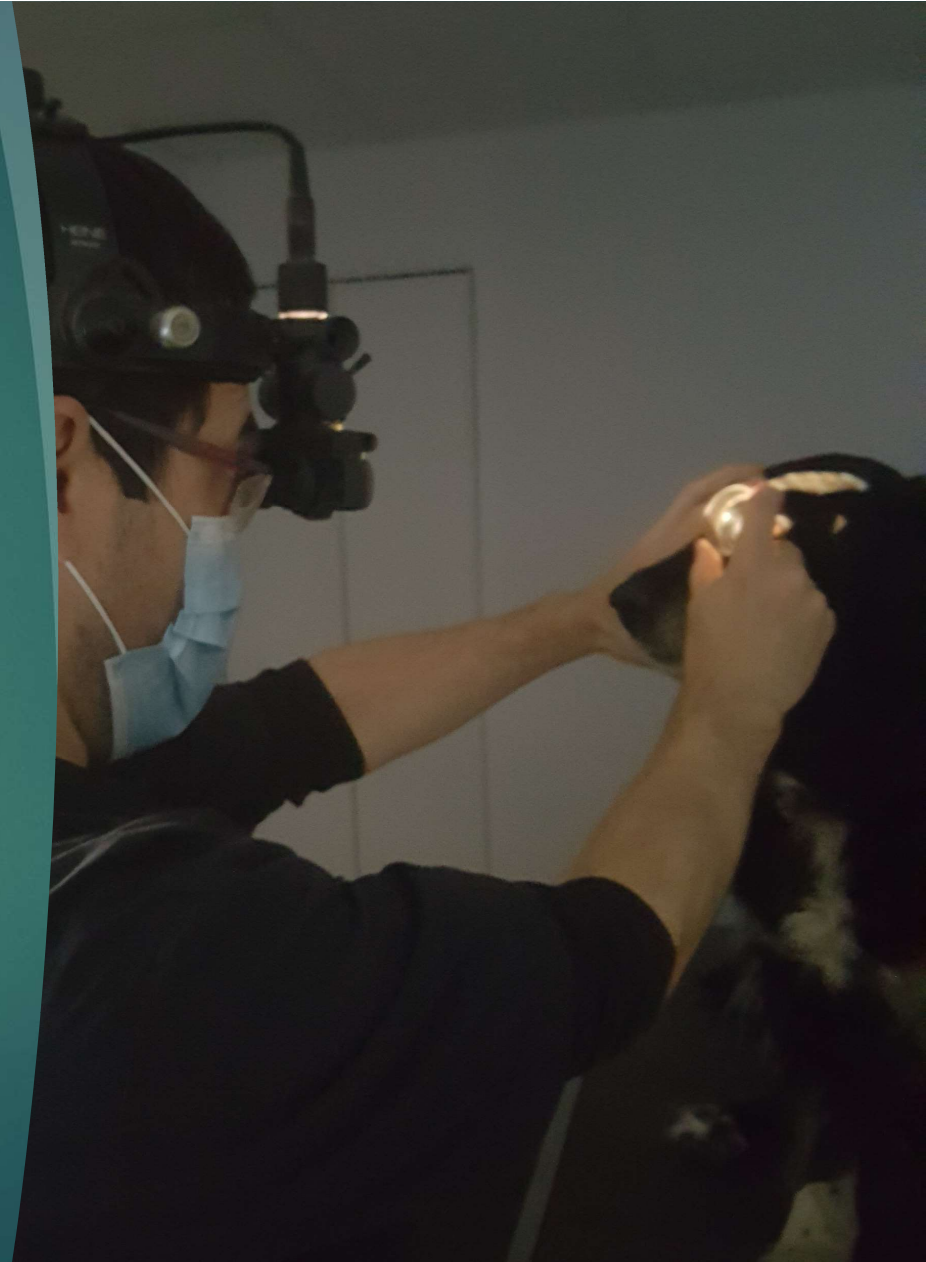
Les maladies oculaires: héréditaires ou non?

G. Chaudieu, DV, Dip ECVO, DESV OV 63122 F-Ceyrat

TIBETAN TERRIER WOLD CONGRESS, 24-25 SEPT.2022

Two questions as an introduction... *Deux questions en introduction...*

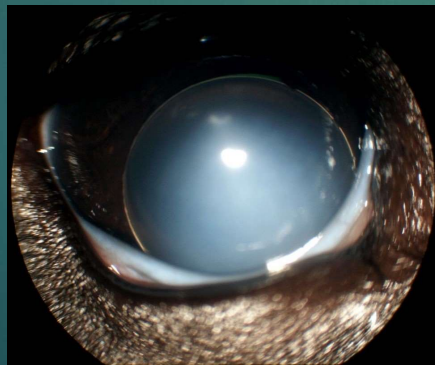
- ▶ Related dogs are they always available for eye examination?
Les sujets apparentés sont-ils toujours à disposition pour les examens oculaires?
- ▶ Is the additional economic burden of a systematic examination for inherited ocular diseases acceptable?
Le surcoût représenté par l'examen systématique de dépistage des maladies oculaires héréditaires est-il une contrainte acceptable?
- ▶ If the answer is yes twice, this lecture could be justified
Si la réponse est deux fois oui, cette présentation est justifiée!



When do we suspect that an ocular disease is inherited?

Quand suspecter qu'une maladie oculaire est héréditaire?

1. Frequency greater than in other breeds
Fréquence supérieure à celle observée dans les autres races
2. Frequency increasing in the breed
Fréquence en augmentation dans la race
3. Frequency greater in related dogs in the breed
Fréquence plus élevée chez les apparentés au sein de la race
4. Age of onset and course of progression predictable
Âge d'apparition et évolution prévisibles



Primary lens luxation

- 1, 2. 20 cases of lens luxation in British-bred Tibetan terriers, together with a further seven from Sweden.
- 3. High levels of inbreeding ranging from 0 to 24,3 per cent, with a mean of 14,3 per cent ; all affected cases traced back to one or more of three animals on both sides of their pedigrees, all three being breed champions.
- 4. The age at onset is three to five years, the PLL may result in elevation of IOP causing vision impairment or blindness.

Willis MB, Curtis R, Barnett KC, Tempest WM. Genetic aspects of lens luxation in the Tibetan terrier. Vet Rec. 1979; 104: 409-12.

When do we suspect that an ocular disease is inherited?

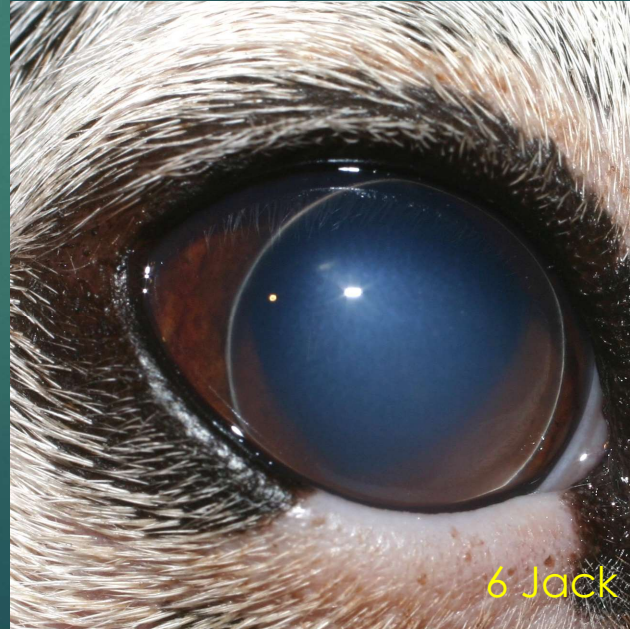
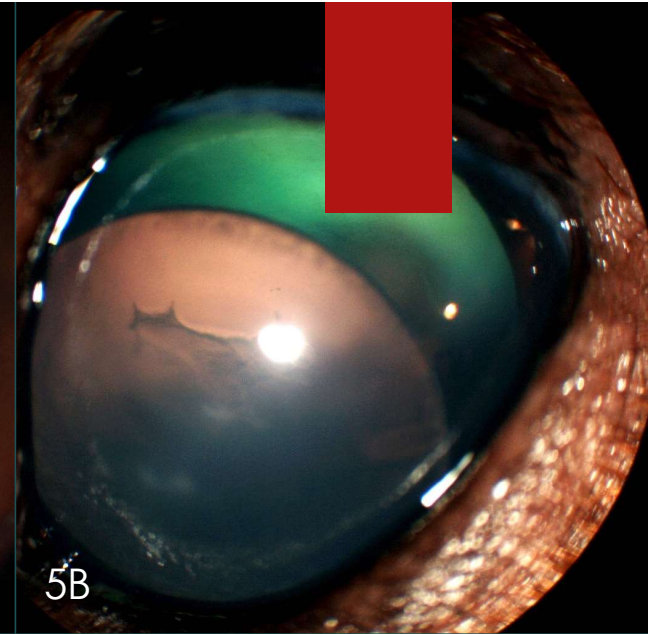
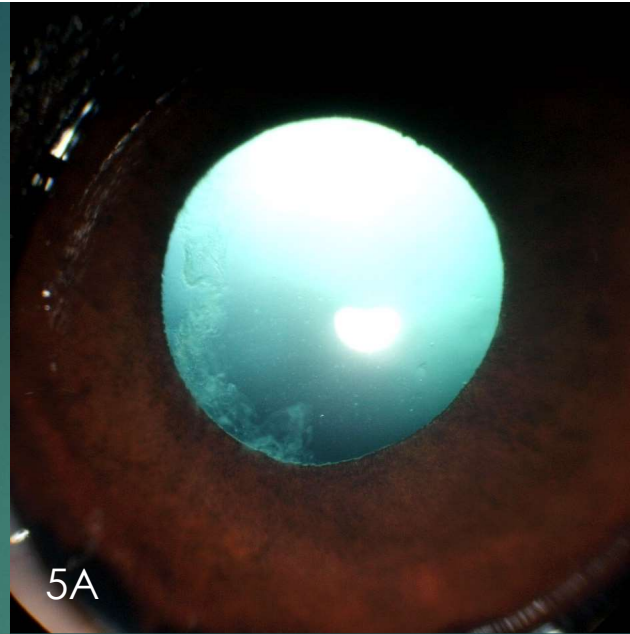
Quand suspecter qu'une maladie oculaire est héréditaire?

► 5. Characteristic clinical signs

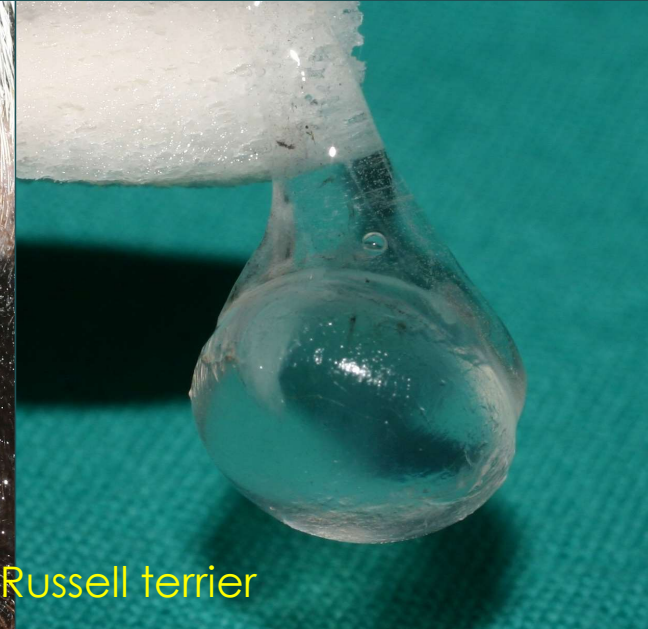
Signes cliniques caractéristiques

► 6. Identical to a disease proven to be inherited in another breed

Signes identiques à ceux observés dans une race où l'origine héréditaire est avérée



6 Jack Russell terrier



Including eye diseases as « suspected inherited or inherited » should be based on recognized criterias

Critères requis pour reconnaître une maladie oculaire comme héréditaire ou présumée héréditaire

1. Published reports in the literature with evidence of inheritance, or presumed inheritance in the breed

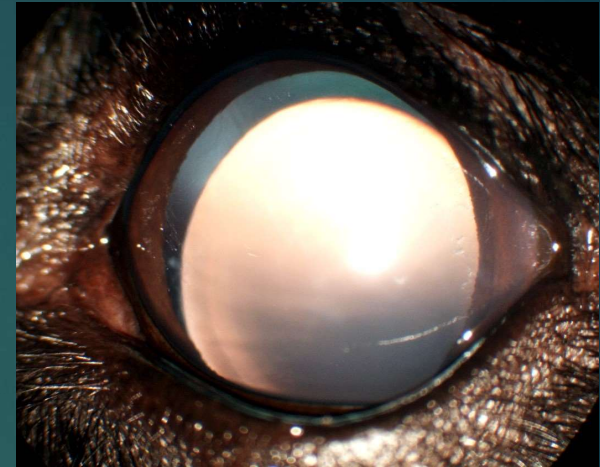
Publications scientifiques rapportant la maladie comme héréditaire ou présumée héréditaire

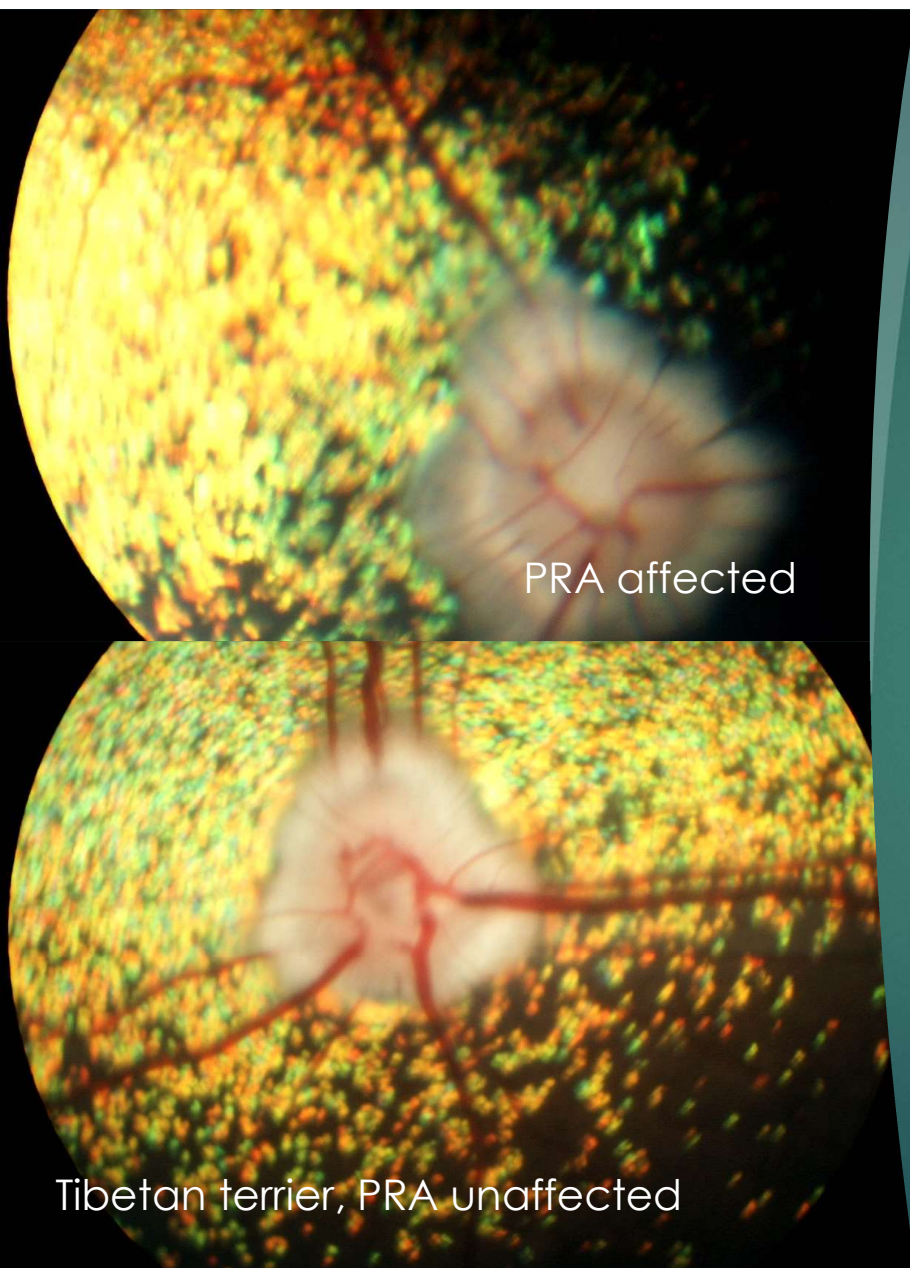
Data from repeat litters between presumed heterozygous animals gave a ratio of 25 lens luxation cases in 121 progeny, which again supported a genetic theory (autosomic recessive disease).

Willis MB, Curtis R, Barnett KC, Tempest WM. **Genetic aspects of lens luxation in the Tibetan terrier.** *Vet Rec.* 1979; 104: 409-12.

Primary lens luxation (PLL) is a well-recognized, painful and potentially blinding inherited ocular condition in dogs. PLL-affected dogs of 30 different breeds were screened, to identify those which carried a previously described c.1473+1 G>A mutation in ADAMTS17 that is associated with PLL in Miniature Bull terriers, Lancashire Heelers, Tibetan terriers and Jack Russell terriers.

Gould D, Pettitt L, Mc Loughlin B, Homes N, Forman O, Thomas A et al. **ADAMTS17 mutation associated with primary lens luxation is widespread among breeds.** *Vet Ophthalmol.* 2011 ;14 : 378-84.





PRA affected

Tibetan terrier, PRA unaffected

Including eye diseases as
« suspected inherited or inherited »
should be based on recognized
criterias

*Critères requis pour reconnaître une maladie oculaire
comme héréditaire ou présumée héréditaire*

- ▶ **2. Clinical confirmation of affected dogs in a breed**
(reference: CERF, ACVO genetic guidelines in making
breeding recommendations)

*Confirmation clinique de chiens atteints dans la race (référence:
CERF, ACVO genetic guidelines)*

- ▶ Incidence of affected individuals $> 1\%$ of the examined population
with a minimum of 5 dogs affected/5 year period
- ▶ Regardless of the population examined, if at least 50 affected
dogs are identified in a 5 year period, the concerned disease is
listed for the concerned breed

**Important: the sensitivity of detection is greater when a
large number of dogs is examined!**

PRA « all forms », in: Ocular disorders report, ACVO:
1991-2014: 8017 Tibetan terriers examined, 121 PRA (1,5%)
2015-2019: 1274 Tibetan terriers examined, 3 affected
(0,2%)

Including eye diseases as « suspected inherited or inherited » should be based on recognized criterias

Critères requis pour reconnaître une maladie oculaire comme héréditaire ou présumée héréditaire

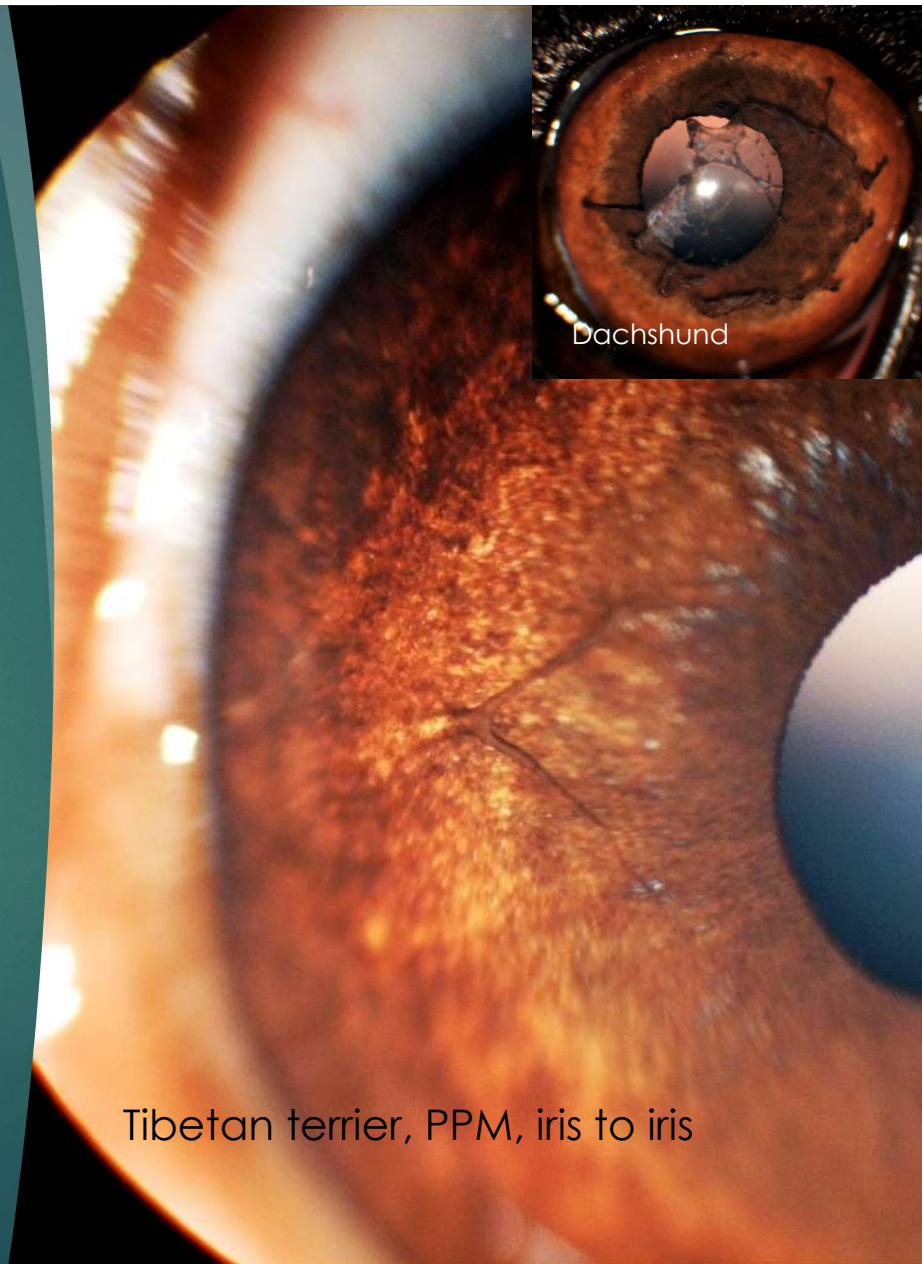
- ▶ 3. A request from the breed club to the Scientific Committee of the SCC (french kennel club) that the disease may be included for the breed, submitted to:

Demande du Club de race adressée à la commission scientifique de la SCC pour inclure la maladie dans celles recherchées dans la race, soumise à:

- ▶ Documentation relative to the disease, number of cases reported in the breed
- ▶ Critical examination of the Scientific Committee and possible classification of the disease under a level of priorities:
 - ▶ « emerging » diseases
 - ▶ included diseases
- ▶ Agreement of the Scientific Committee

Persistent pupillary membrane (PPM)

- Minor forms only (iris-iris, pigment foci): 9,9% (CERF/ACVO), 6,8% (personal)
- Iris-cornea, iris-lens, sheets: <0,5% (CERF/ACVO, 1274 dogs examined), 0 (personal)
- Suspected inherited?



Tibetan terrier, PPM, iris to iris

Including eye diseases as « suspected inherited or inherited » should be based on recognized criterias

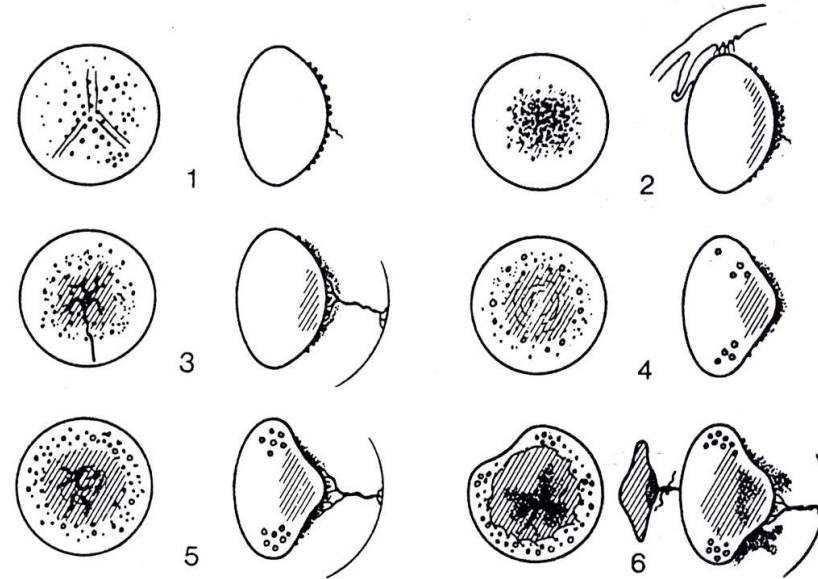
*Critères de requis pour reconnaître une maladie
oculaire comme héréditaire ou présumée héréditaire*

- ▶ 4. Clinical experience of one or several national Eye Scheme Panelists indicating a particular condition in the breed without scientific publication or previous evidence of affected dogs

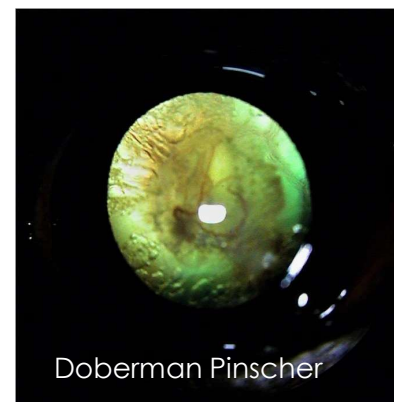
Expérience clinique d'un ou plusieurs Examineurs nationaux rapportant une situation compatible avec la présence d'une maladie oculaire présumée héréditaire pas encore signalée dans la littérature ou antérieurement dans la race

Persistent Hyperplastic Tunica Vasculosa lentis/Persistent Hyperplastic Primary Vitreous (PHTVL/PHPV) in the Tibetan Terrier:

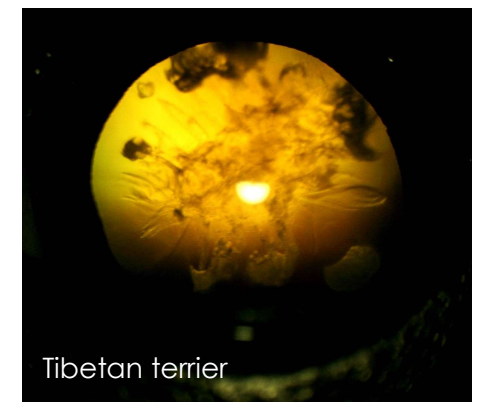
- some cases observed (grade 2-6 under Stades classification, that means visual impairment)
- reported in other breeds (Doberman Pinscher, Staffordshire Bull Terrier...) as autosomal dominant with a strong penetrance)
- suspected inherited in the Tibetan Terrier?



PHTVL/PHPV (from Stades FC. Persistent hyperplastic tunica vasculosa lentis and persistent hyperplastic primary vitreous (PHTVL/PHPV) in 90 closely related Doberman Pinschers: clinical aspects. J Am Anim Hosp Assoc. 1980; 16 : 739-51)



Doberman Pinscher



Tibetan terrier

Including eye diseases as « suspected inherited or inherited » should be based on recognized criterias

Critères requis pour reconnaître une maladie oculaire comme héréditaire ou présumée héréditaire

- 5. Results of genetic reseach and genetic testing in a significantly representative population of the breed

Études génétiques fondamentales et validations populationnelles significatives dans l'effectif racial

Clinical follow up essential!

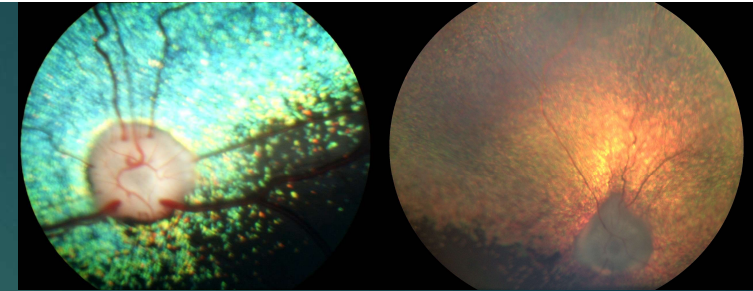
PRA3, late onset disease (clinical signs when 4-5 yo): PRA in the TS has not previously been associated with any genetic variants. Using a GWA mapping approach, a novel candidate variant, *FAM161A*, was identified that is likely to represent a major causal mutation for PRA in the TS. While this mutation does not account for all cases of PRA in this study, **suggesting that there are additional loci causing PRA in this breed**, it does appear to be highly penetrant and a major cause of PRA in this breed. While PRA3 is also present in TT, as they are closely related and the mutation has not been found in any other breeds, **the mutation appears to be confined to these two breeds**.

Downs LM, Mellersh CS (2014). An Intronic SINE Insertion in *FAM161A* that Causes Exon-Skipping Is Associated with Progressive Retinal Atrophy in Tibetan Spaniels and Tibetan Terriers. *PLoS ONE* 9(4): e93990. doi:10.1371/journal.pone.0093990

PRA4, late onset disease, slowly progressive: This is the same mutation previously found to cause PRA in Gordon Setters and Irish Setters, and it was later found in Tibetan Terrier, Standard Poodle and the Polski Owczarek Nizinny. **The presence of the mutation in such a diverse range of breeds indicates an origin preceding creation of modern dog breeds**. Hence, we screened 262 dogs from 44 different breeds plus four crossbred dogs, and can subsequently add Miniature Poodle and another polish sheepdog, the Polski Owczarek Podhalanski, to the list of affected breeds.

Karskov-Mortensen P, Proschowsky HF, Gao F, Fredholm M. Identification of the mutation causing progressive retinal atrophy in Old Danish Pointing Dog. 2018. *Anim Genet* ; 49 : 237-41.

PRA of PON dogs and Tibetan terriers is a **late-onset degenerative disease with slow progression**. There is early loss of rod function, while the cone system deteriorates later. Svensson M, Olsén L, Winkler PA, Petersen-Jones S. Progressive retinal atrophy in the Polski Owczarek Nizinny dog : A clinical and genetic study. *Vet Ophthalmol*. 2015 ; 19 : 195-205



PRA 3

PON, 8 yo (court B. Michaud)

Conclusion

- ▶ Diagnosis under a reliable scheme is the rule before considering an ocular disease as inherited
- ▶ Genetic test is a useful/powerful complementary procedure when existing
- ▶ A large clinical follow-up is the condition to evaluate the situation in a breed



Thank you for attention!



Professeur Jean-Pierre Genevois
Orthopedist - Expert of the FCI scientific commission

Normal hips
what are the criteria?

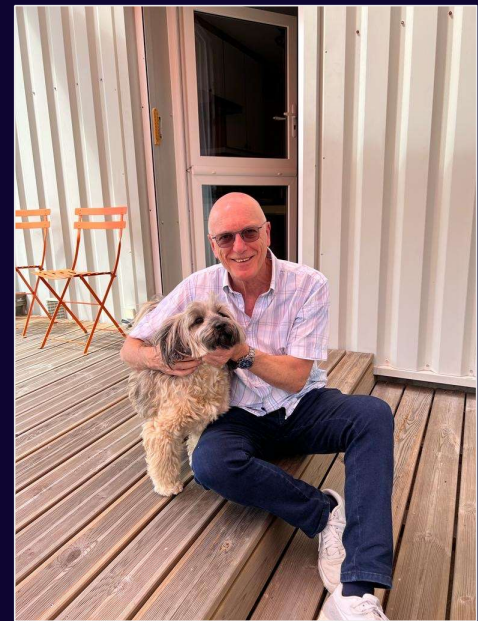
Tibetan terriers world congress

*Agnetz september 25th
2022*

*Normal
hips*



what criteria ?

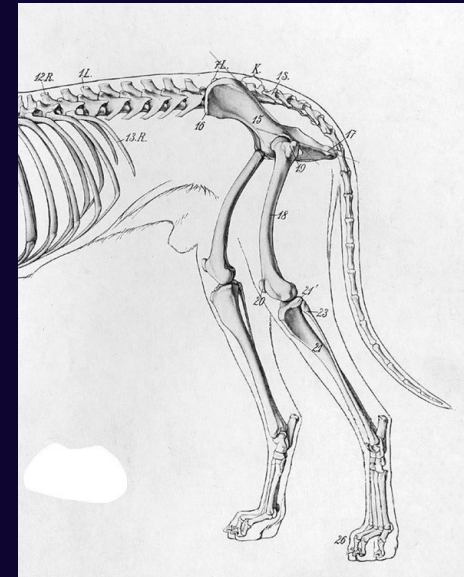


Pr. Jean-Pierre GENEVOIS

Hip joint = submitted to huge mechanical strains

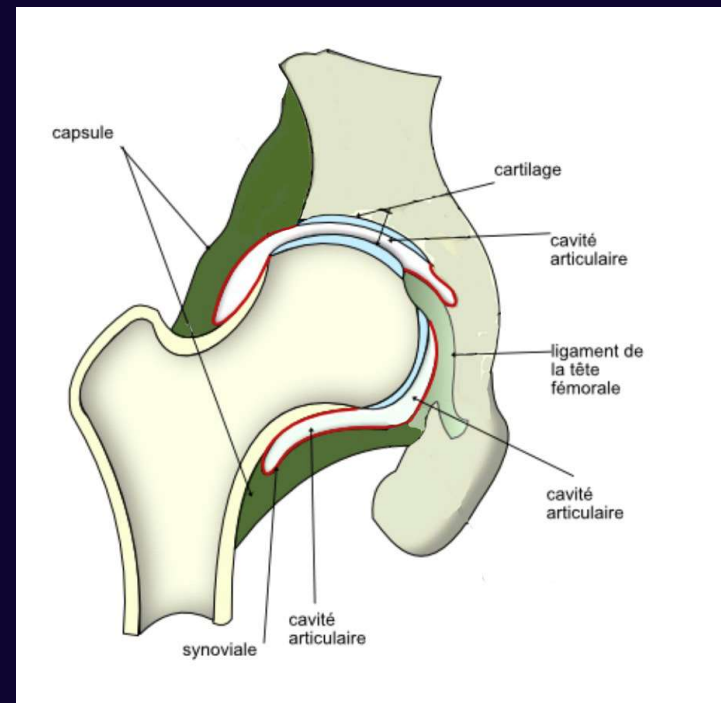
*role ++ standing & sitting position, transmission
of impulses from hind leg to the body*

*very big range of motion (extension/flexion, abduction/adduction
external rotation / internal rotation),*





*normal hip :
femoral head deeply seated
(« covered »)
in the acetabulum*



Hip joint = synovial joint



normal hip= stable (tight) hip

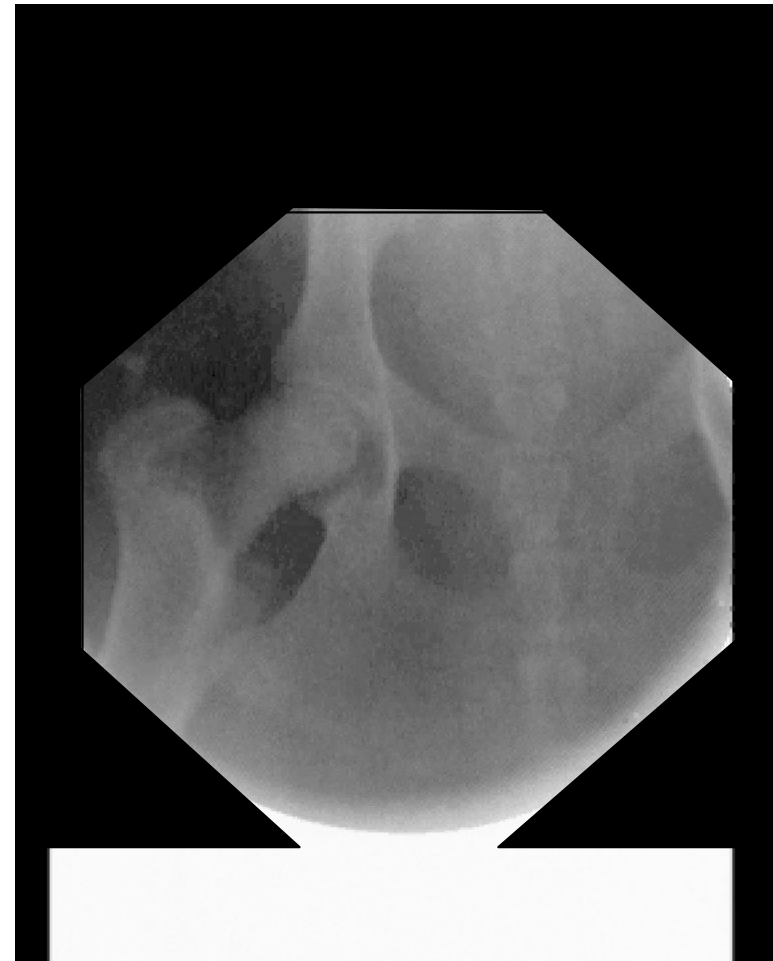
*! the femoral head remains deeply seated
in the acetabular cavity during all the movements*

*! no lateral movements allowed
outside of the acetabulum*

Stable (tight) hip

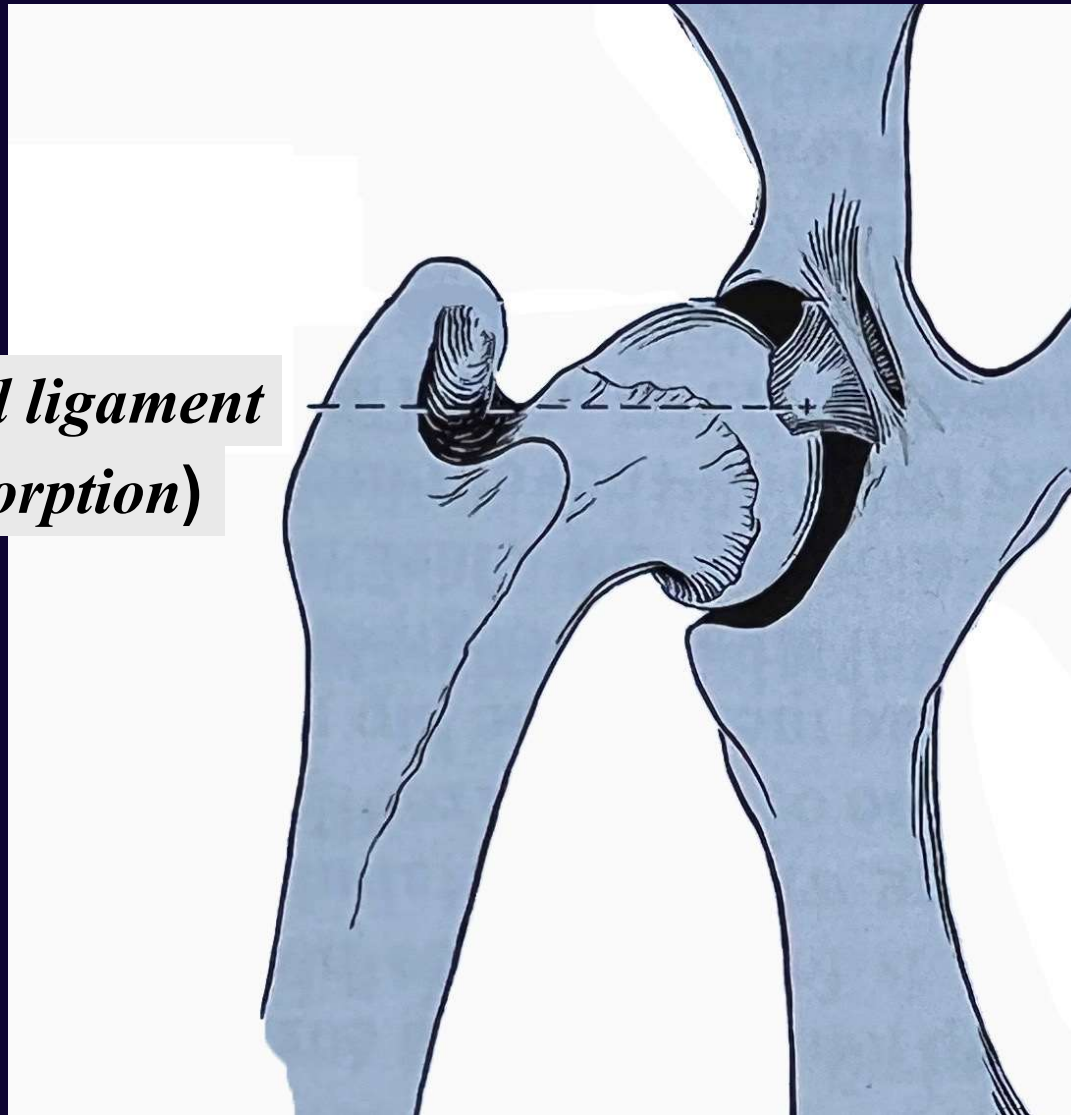
*stays perfectly seated
in the acetabular cavity*

Crédit : Aldo VEZZONI

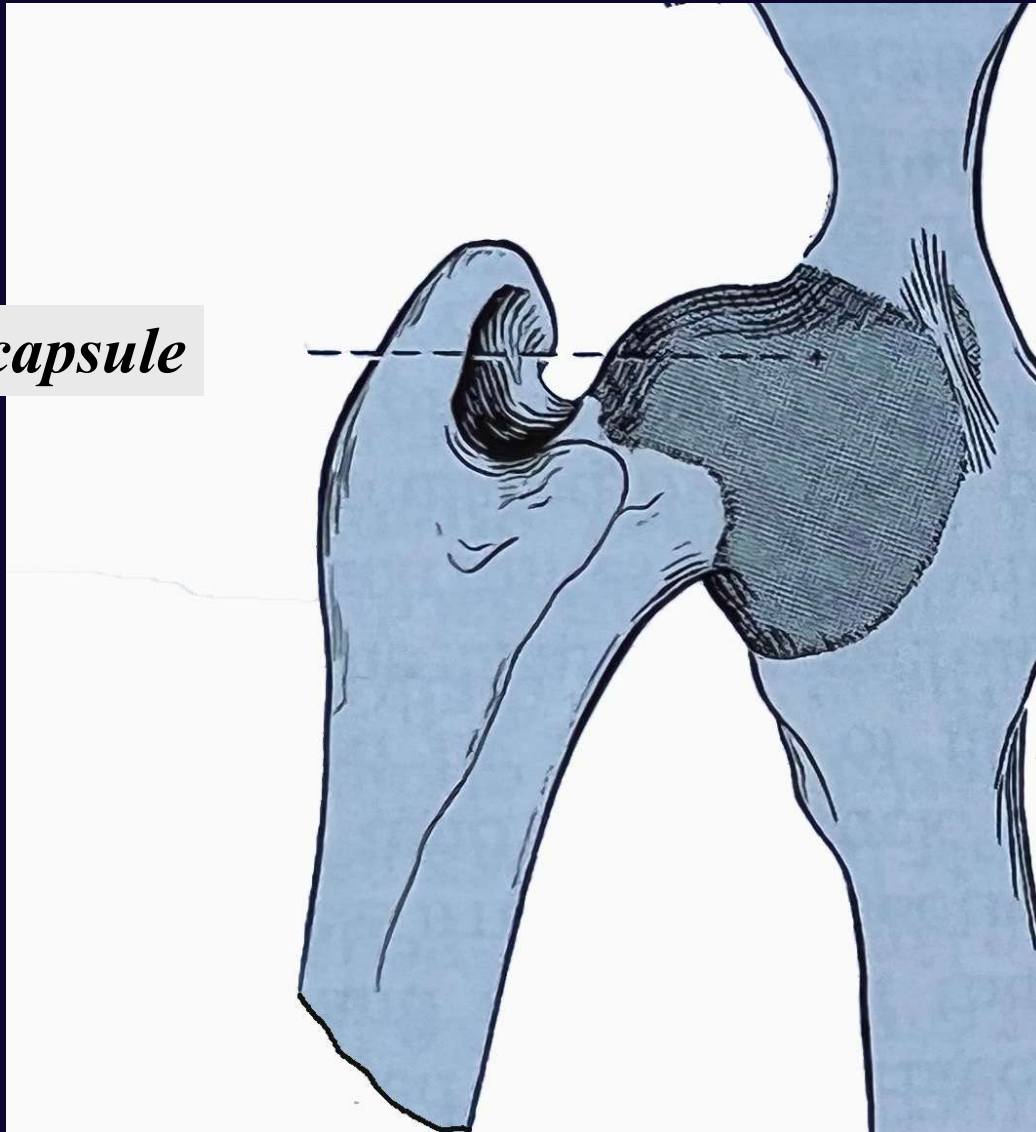


*on what relies
the hip joint stability
?*

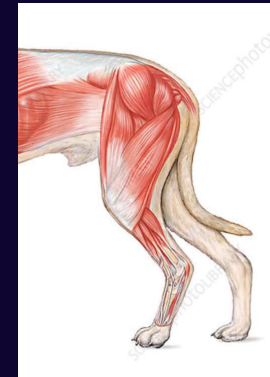
*Round ligament
(shock absorption)*



Joint capsule



*active stability
gluteus muscles*



Gluteus medius



Gluteus superficialis

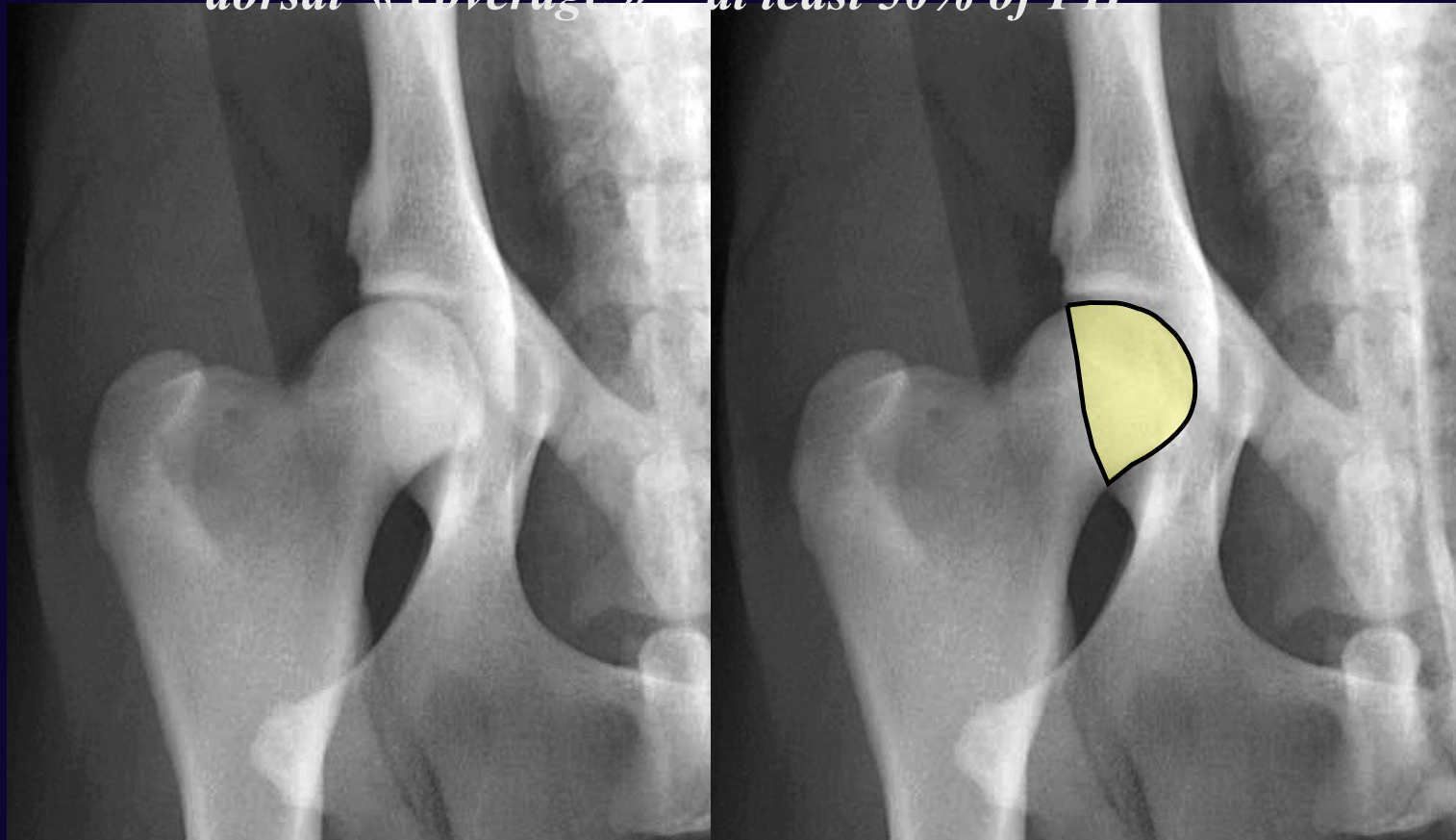
+ deep gluteus (hidden)

*Forces exerted on the hip joint
depending on biomechanical
conditions*

<i>Conditions biomécaniques</i>	<i>Forces de réaction articulaire</i>
<i>Appui sur 4 membres</i>	<i>0,07 PV</i>
<i>Appui sur 3 membres</i>	<i>0,7 PV (x10)</i>
<i>Marche (2 m/sec)</i>	<i>1,4 PV (x20)</i>
<i>Course (15 m/sec)</i>	<i>4,6 PV (x65)</i>

*Repris de Biomécanique de la hanche du chien - A. AUTEFAGE
CES Orthopédie – ENVT- 2022*

*illustration of the FH pressure surface on the acetabulum
normal hip :
dorsal « coverage » = at least 50% of FH*



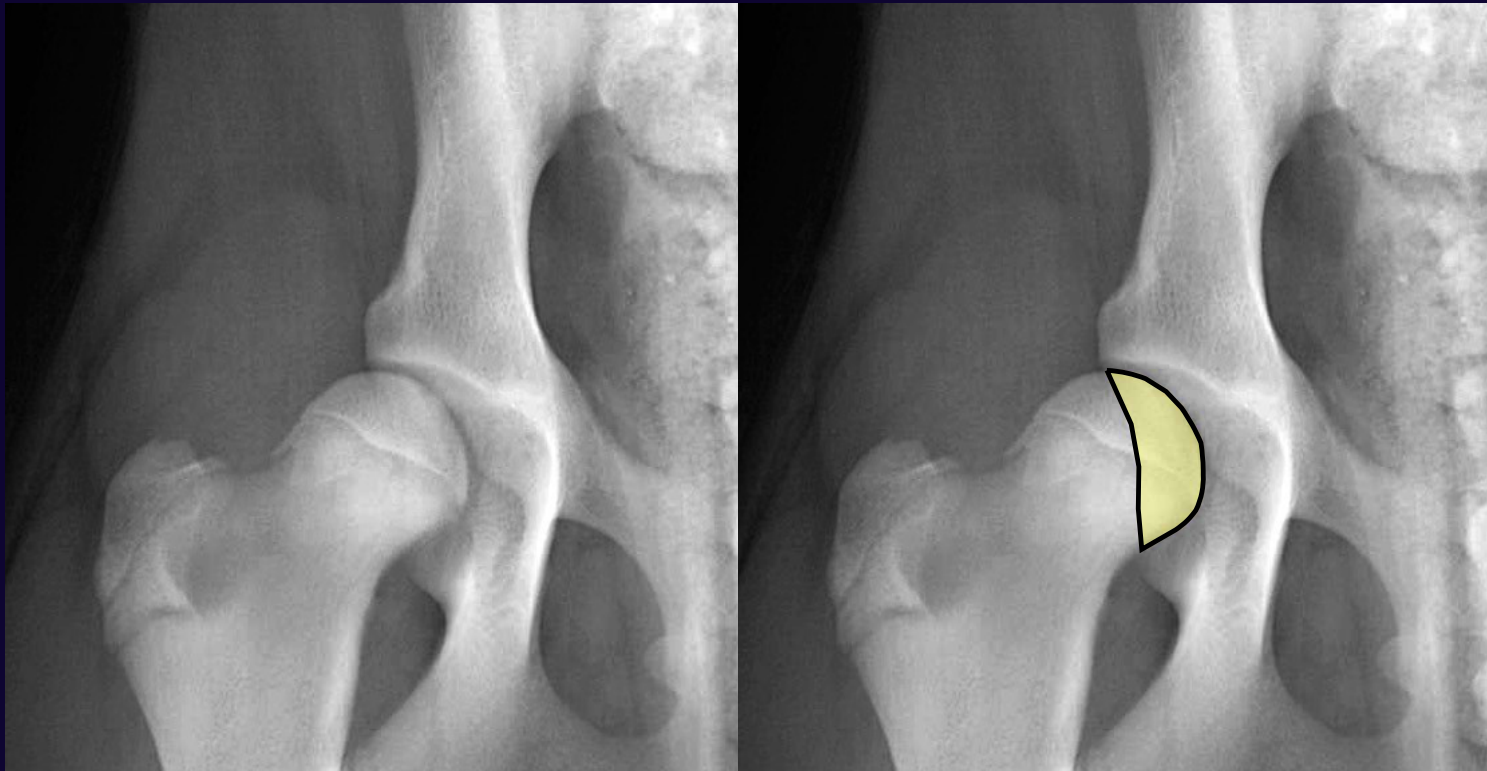
*Repris de Biomécanique de la hanche du chien - A. AUTEFAGE
CES Orthopédie – ENVT- 2022*

*HIP DYSPLASIA =
developmental
condition
linked to joint
instability
resulting at +/- long term in joint profile
alterations
and osteoarthritic development*



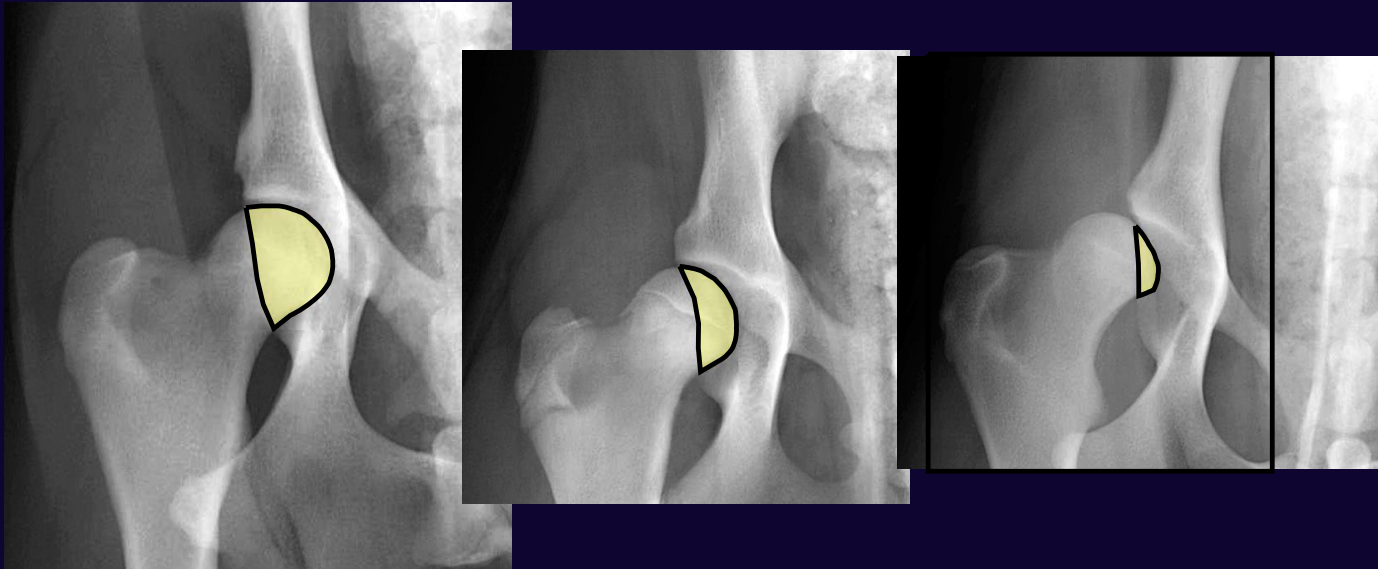
*instability : the femoral head
can «move out» of the acetabulum*

*instabilité (sub-luxation)
illustration of the pressure
surface (moderate hip dysplasia)*



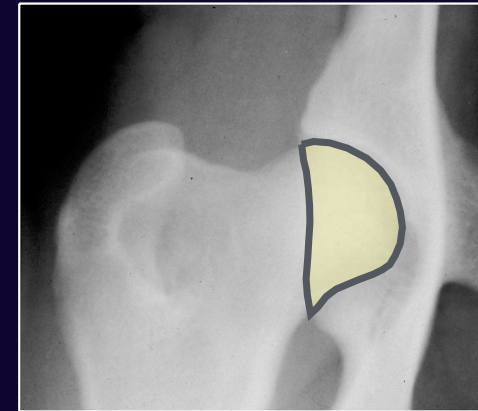
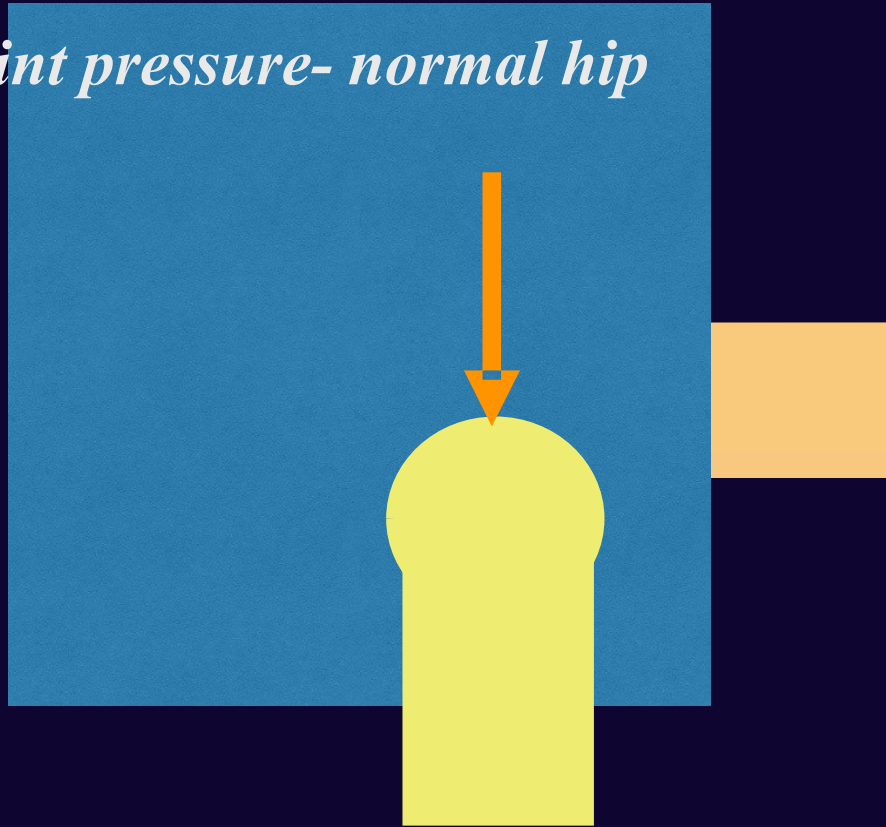
*Repris de Biomécanique de la hanche du chien - A. AUTEFAGE
CES Orthopédie – ENVT- 2022*

*consequences of femoral head
position on the pressure zone*



*Repris de Biomécanique de la hanche du chien - A. AUTEFAGE
CES Orthopédie – ENVT- 2022*

Joint pressure- normal hip



dog 30 kg

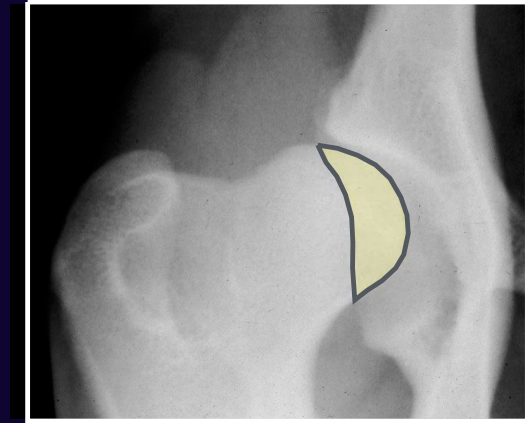
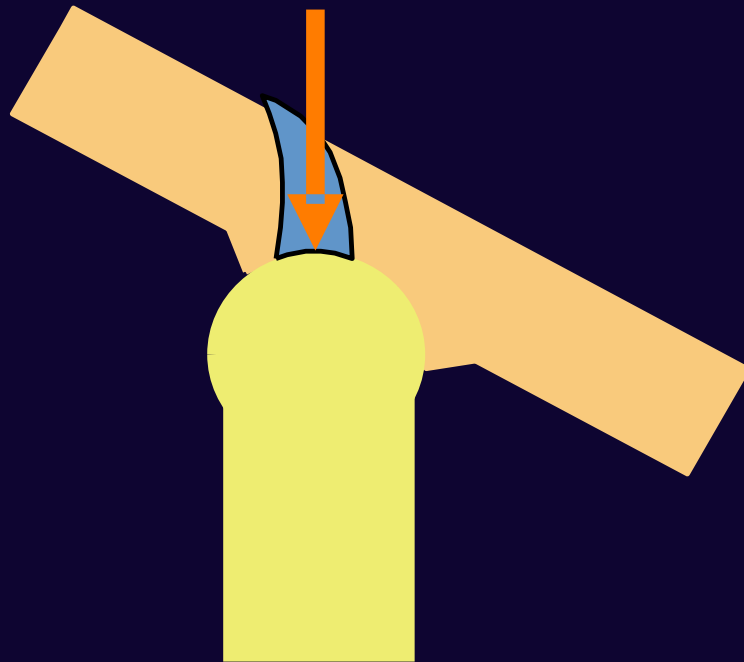
running : 15 m/s

Surface : 220 mm²

Charge : 0,6 kg / mm²

*Repris de Biomécanique de la hanche du chien - A. AUTEFAGE
CES Orthopédie – ENVT- 2022*

Joint pressure- moderate hip dysplasia



dog 30 kg

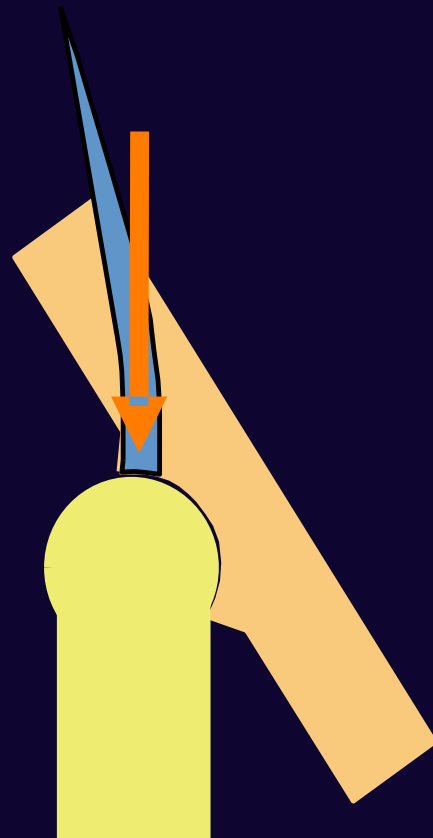
running : 15 m/s

Surface : 110 mm²

*Charge : 2,0 kg / mm²
more than x 3*

*Repris de Biomécanique de la hanche du chien - A. AUTEFAGE
CES Orthopédie – ENVT- 2022*

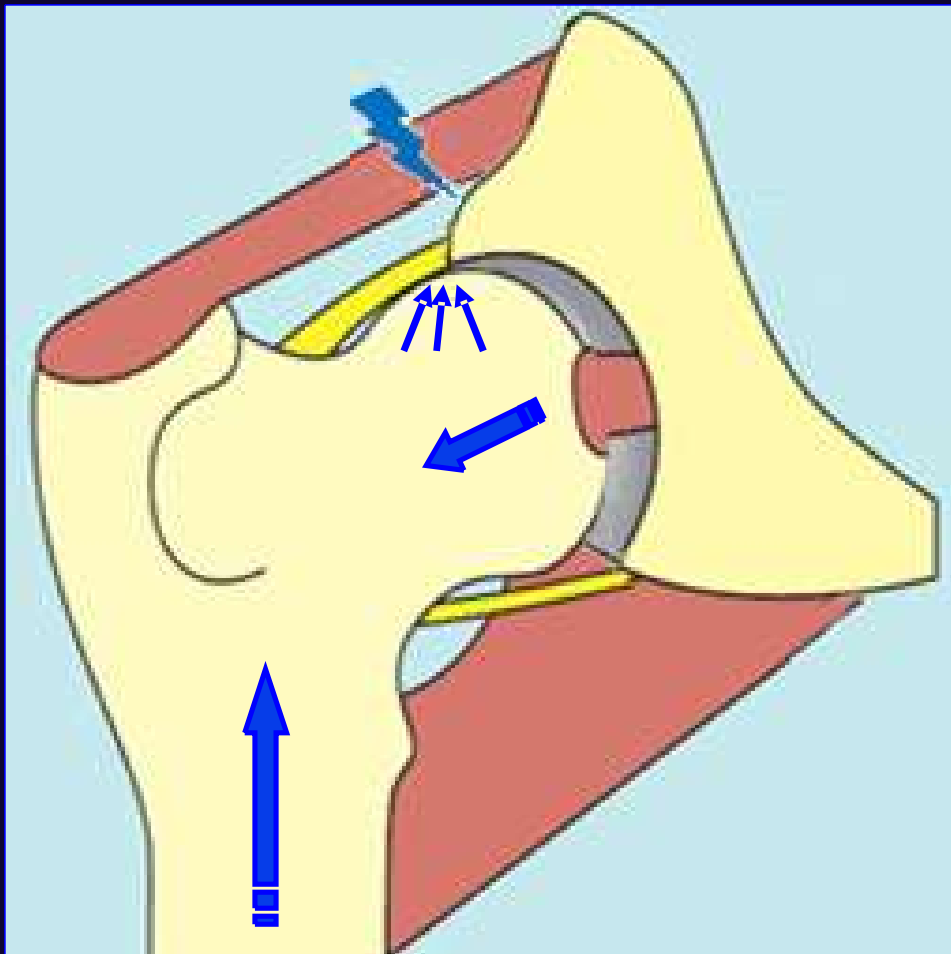
Joint pressure- severe dysplasie



Surface : 30 mm²

*Charge : 6,9 kg / mm²
more than x 10*

*Repris de Biomécanique de la hanche du chien - A. AUTEFAGE
CES Orthopédie – ENVT- 2022*



bad pressure distribution



cartilage lesions

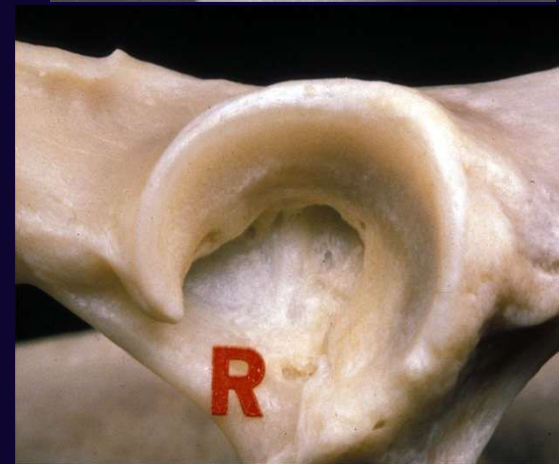
*underlying bone lesions
(shallow
acetabulum)
joint inflammation*

*Modifié d'après DEROY-BORDENAVE et coll,
Le Point Vétérinaire, Mai 2016, 365, 20-42*

*normal
acetabulum*



*shallow acetabulum
(dysplastic dog)*



*Repris de Biomécanique de la hanche du chien - A. AUTEFAGE
CES Orthopédie – ENVT- 2022*

BARDENS
test



ORTOLANI test





Perfect Hip

Even joint space

rounded cranial acetabular rim

excellent dorsal femoral head coverage

Imperfect hip

lateral narrowing of joint space

craniolateral rim diverges

poor dorsal femoral head coverage





*HD official radiographic screening
standard position
(growth end)*

*TT, sometimes
difficult to achieve*

*very abundant coat
difficult to check anatomical
landmarks*

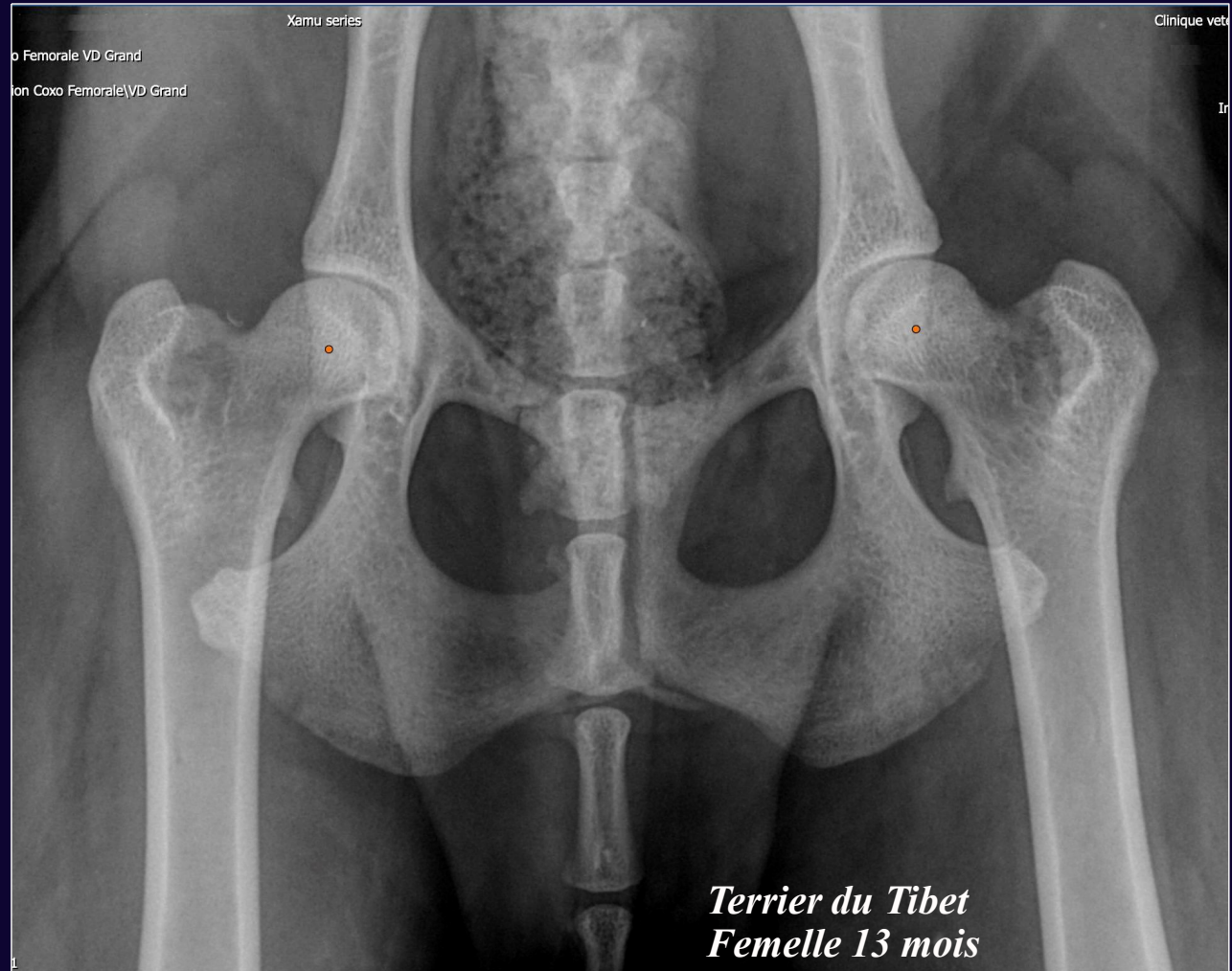
Not very « padded » rear end



*Pb of pelvic symmetry
Pb of patellar positioning*

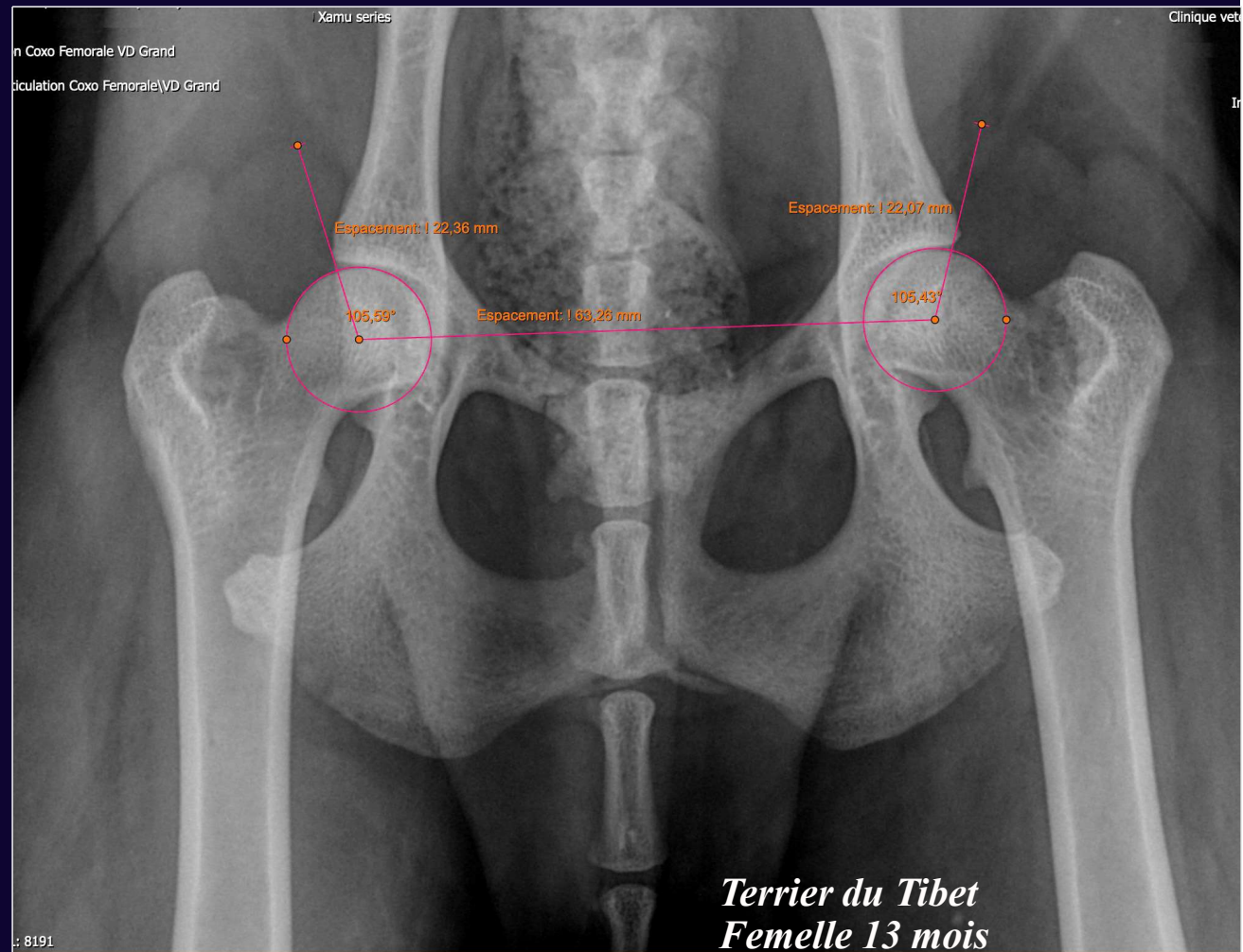


Joint space
position FH center
(dorsal coverage quality)



Crédit Dr G. CHAUDIEU

Norberg Angle



Crédit Dr G. CHAUDIEU



*Terrier du Tibet
Femelle 17 mois*

Crédit Dr G. CHAUDIEU



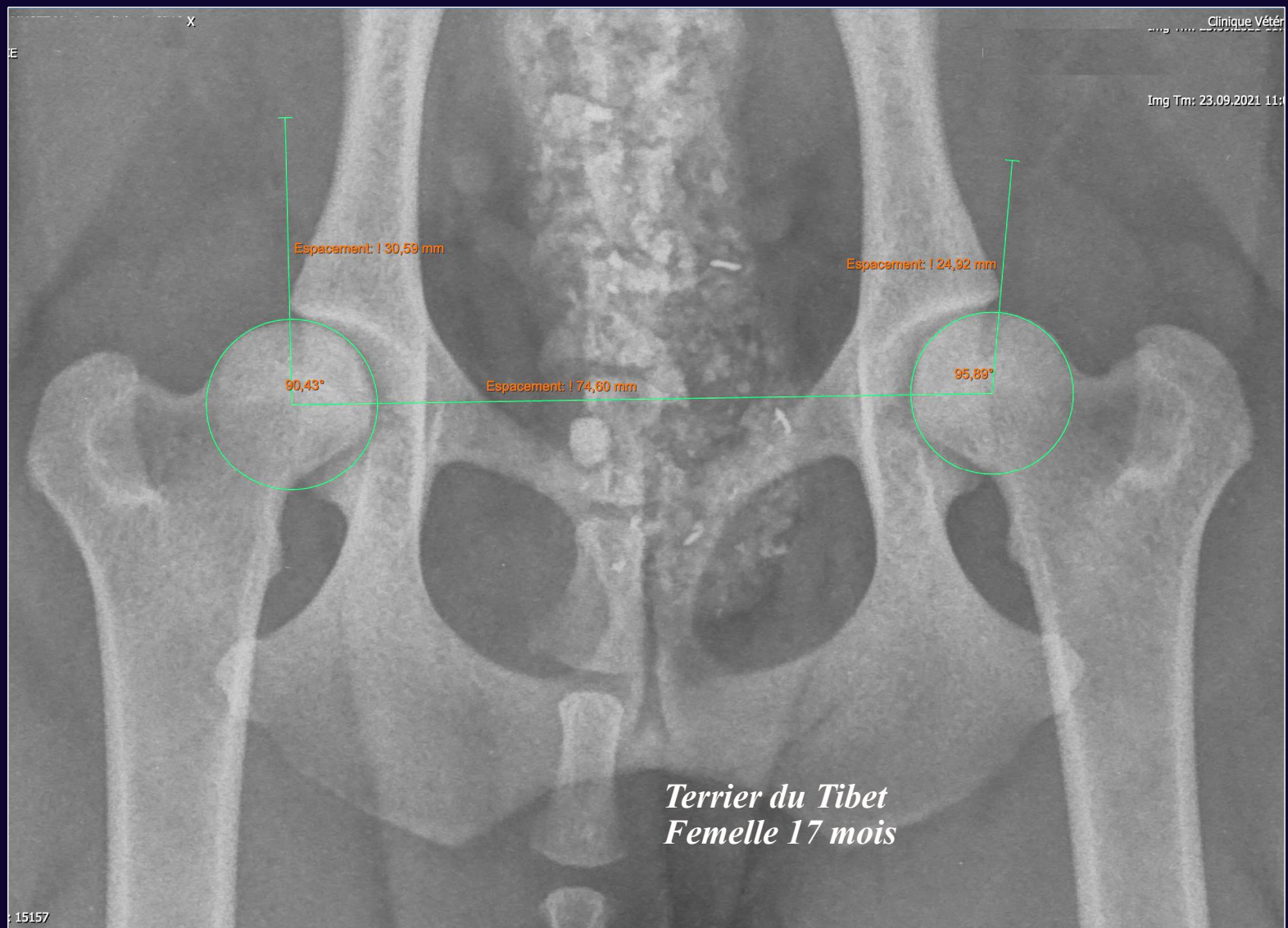
*Terrier du Tibet
Femelle 13 mois*



*Terrier du Tibet
Femelle 17 mois*



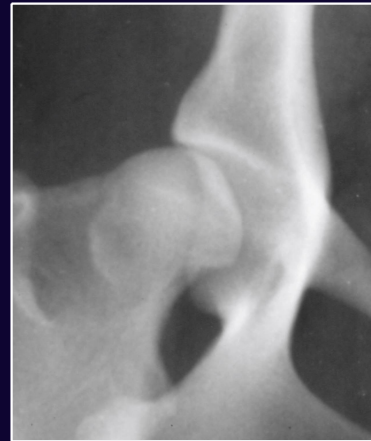
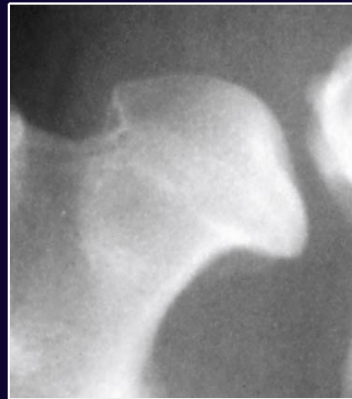
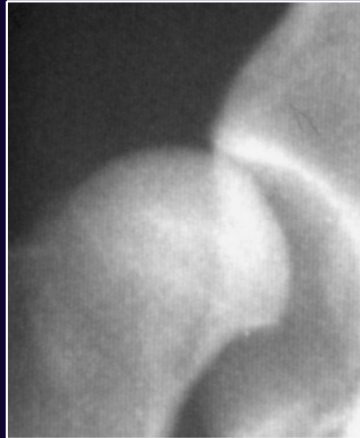
Credit Dr G. CHAUDIEU



Credit Dr G. CHAUDIEU

- *Osteoarthritic modifications*

head and neck osteophytes



acetabular osteophytes

- *Osteoathritic modifications*



FCI classification

(Europe, except UK)

5 grades

A : no sign of HD

B : near normal

C : mild HD

D : moderate HD

E : severe HD

early dia

standard



Newfoundland 4 M

ear

standard position radiograph



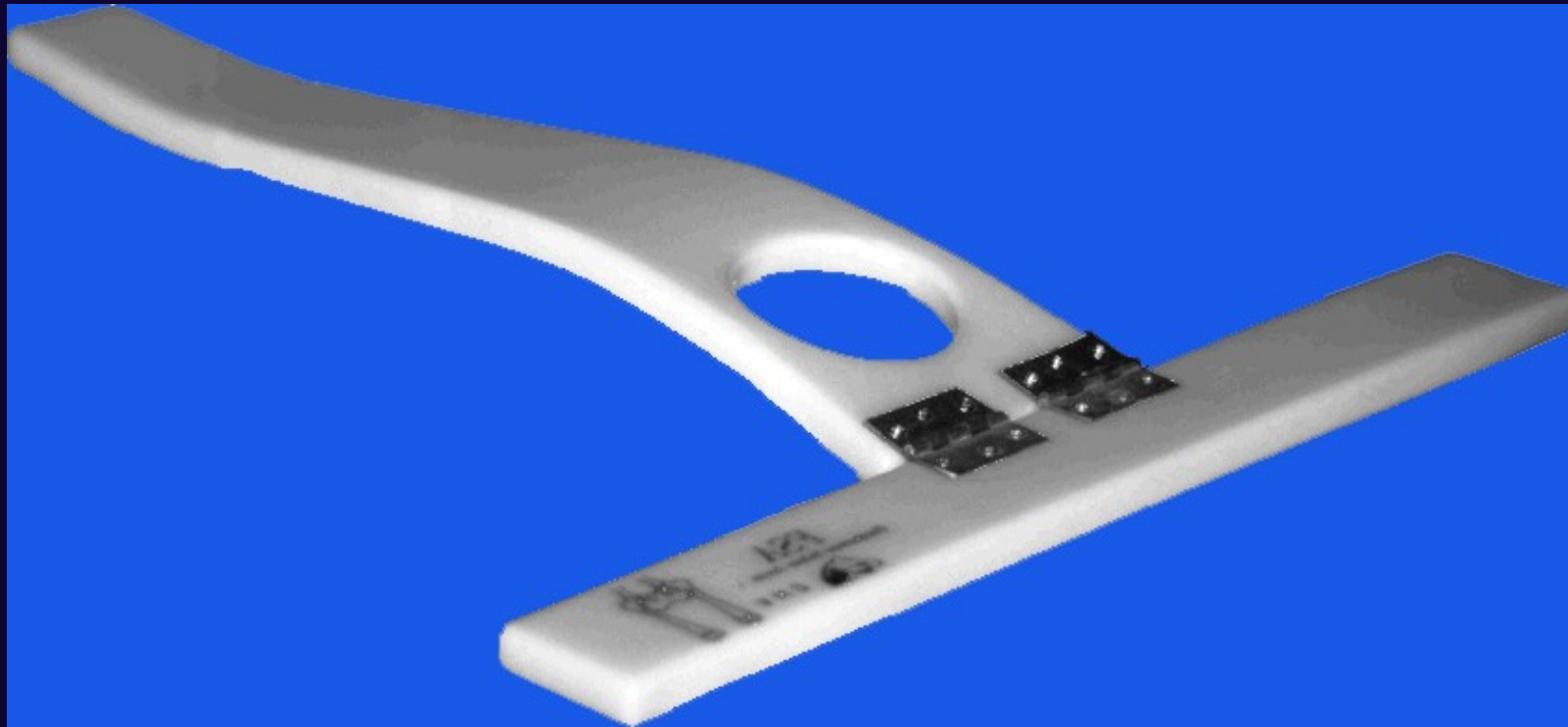
*informative
only
if abnormality detected*

Early measurement of hip joint laxity

(stress radiographic methods)

PennHip - SMITH G.K. & coll JAVMA 1990,196, 1, 59-70

A.VEZZONI distractor



Early measurement of hip joint laxity

(stress radiographic methods)



compression view



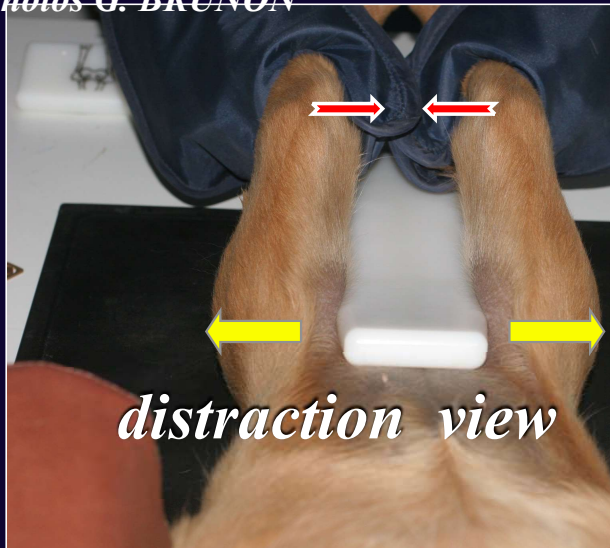
LEXY golden retriever F 4 mois

Early measurement of hip joint laxity

(stress radiographic methods)



Photos G. BRUNON



distraction view



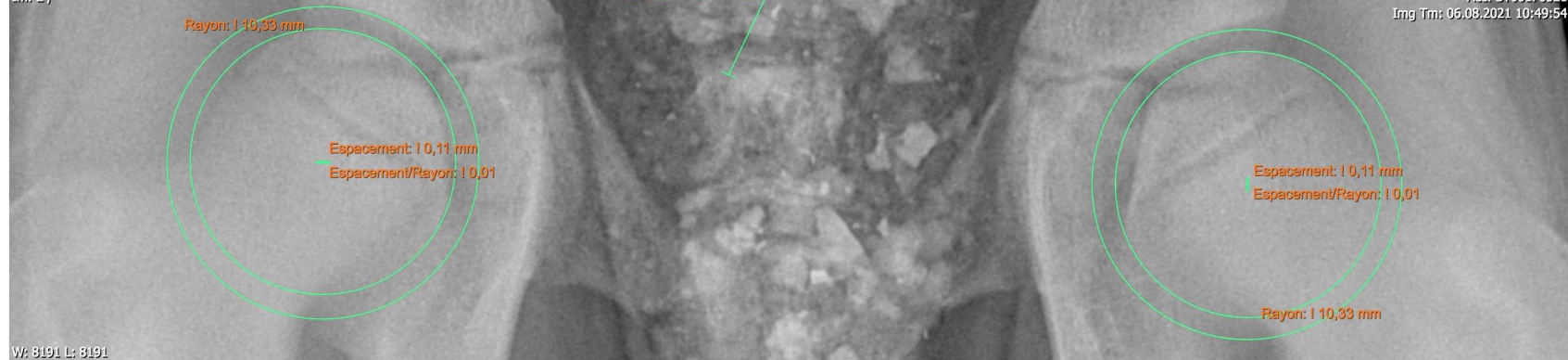
LEXY golden retriever F 4 mois

Early measurement of hip joint laxity

(stress radiographic methods)

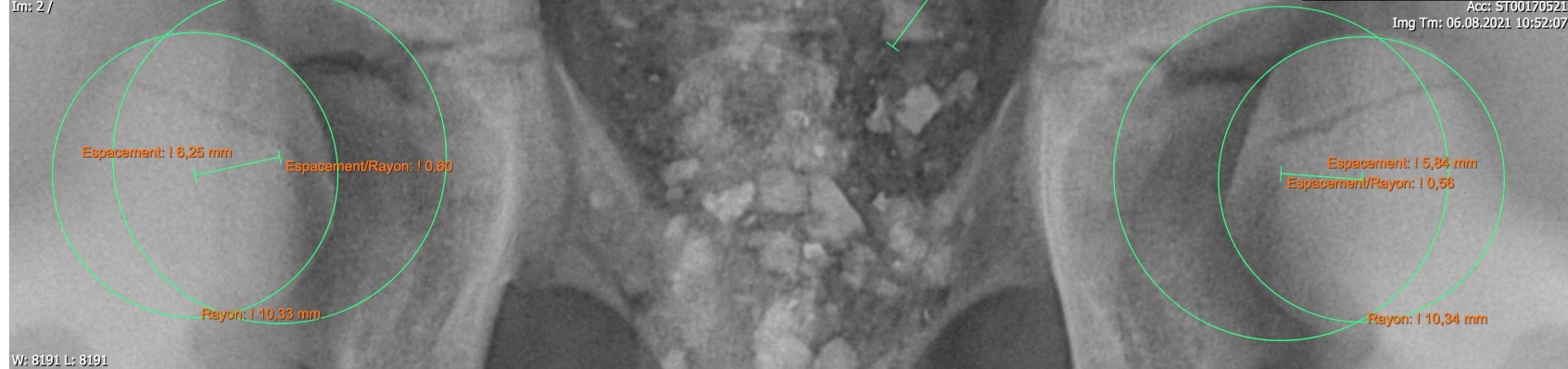
EX:
Articulation Coxo Femorale VD Grand
Ser: 4
Canine/Articulation Coxo Femorale/VD Grand
Im: 2 /

Acc: ST00170521
Img Tm: 06.08.2021 10:49:54



EX:
Articulation Coxo Femorale VD Grand
Ser: 5
Canine/Articulation Coxo Femorale/VD Grand
Im: 2 /

Acc: ST00170521
Img Tm: 06.08.2021 10:52:07



Mean DI in the TT (PennHip database) : 0,54

*breed « anatomical
linked to selection: shallow acetabulum
specificity »*



*Bouledogue anglais
Femelle 11 mois*



*Sussex Spaniel
Femelle 12 mois*

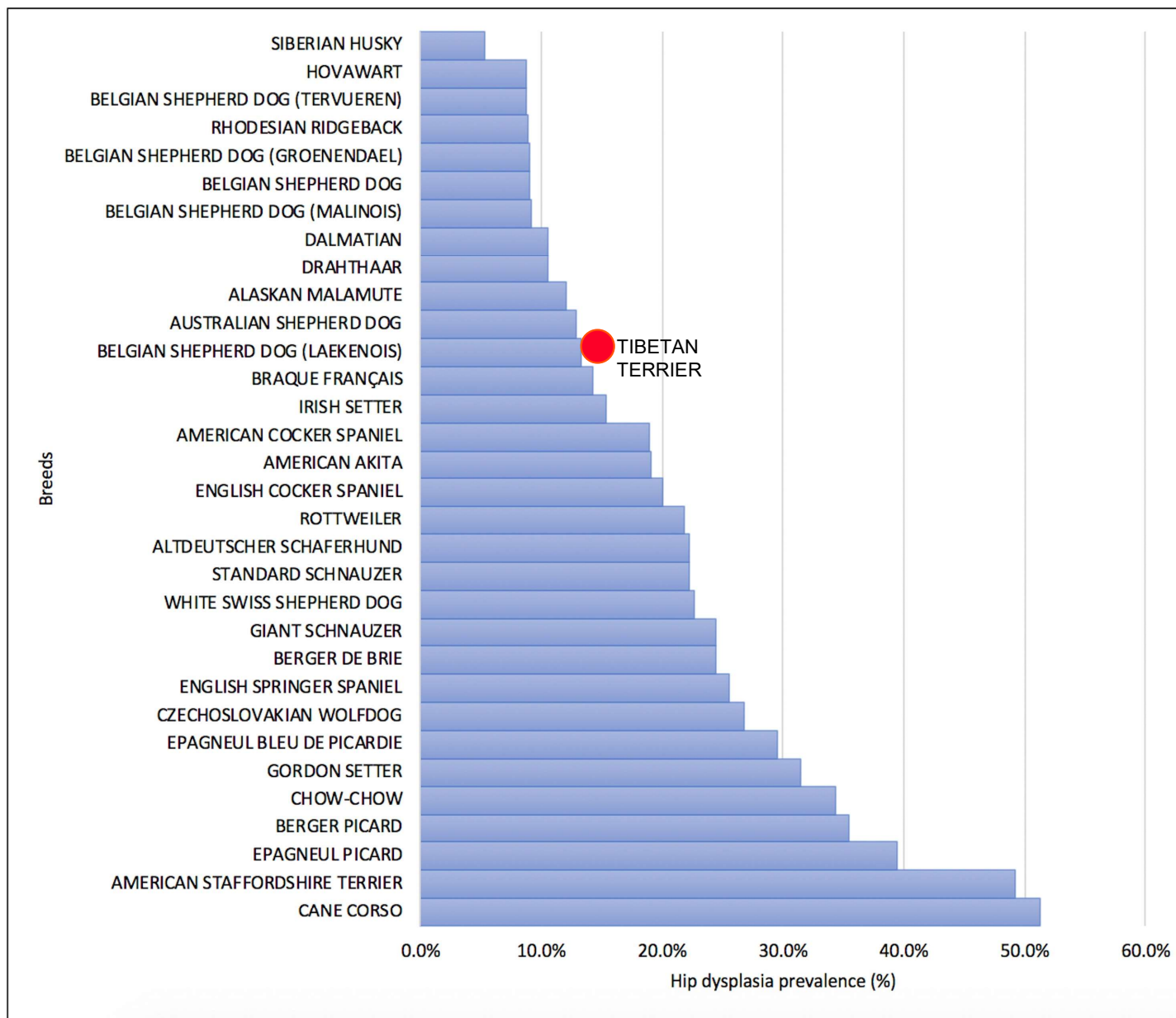


*American bully
Femelle 13 mois*

*paradoxically
not always lameness
(quality of gluteus muscles)*

Conclusion

*starting conditions (HD prevalence)
variable among breeds*



Conclusion

*starting conditions (HD prevalence)
variable among breeds*

*the role of official radiographic scrutineer(s)
in conjunction with people in charge of breed-club*

*is important
to favour as breeding dogs
good hip individuals*

*depending on the starting point in the breed
the aim is to progressively
improve the condition*

Conclusion

mass phenotypic selection is efficient on long term

*BALDINGER A., GENEVOIS JP. & Coll, Prevalence of canine hip dysplasia in 10 breeds in France, a retrospective study of the 1997-2017 radiographic screening period , PLOS ONE (2020), July 9, 1-11,
<https://doi.org/10.1371/journal.pone.0235847>*

*GENEVOIS JP. , BALDINGER A. & Coll, Prevalence of canine hip dysplasia in 17 breeds in France, a retrospective study of the 1993—2019 radiographic screening period Revue vétérinaire clinique (2020) 55, 123—146
<https://doi.org/10.1016/j.anicom.2020.09.003>*

*progress is slow,
selection policy need to be carried out with perseverance*

Conclusion

« 5 generation » pedigrees

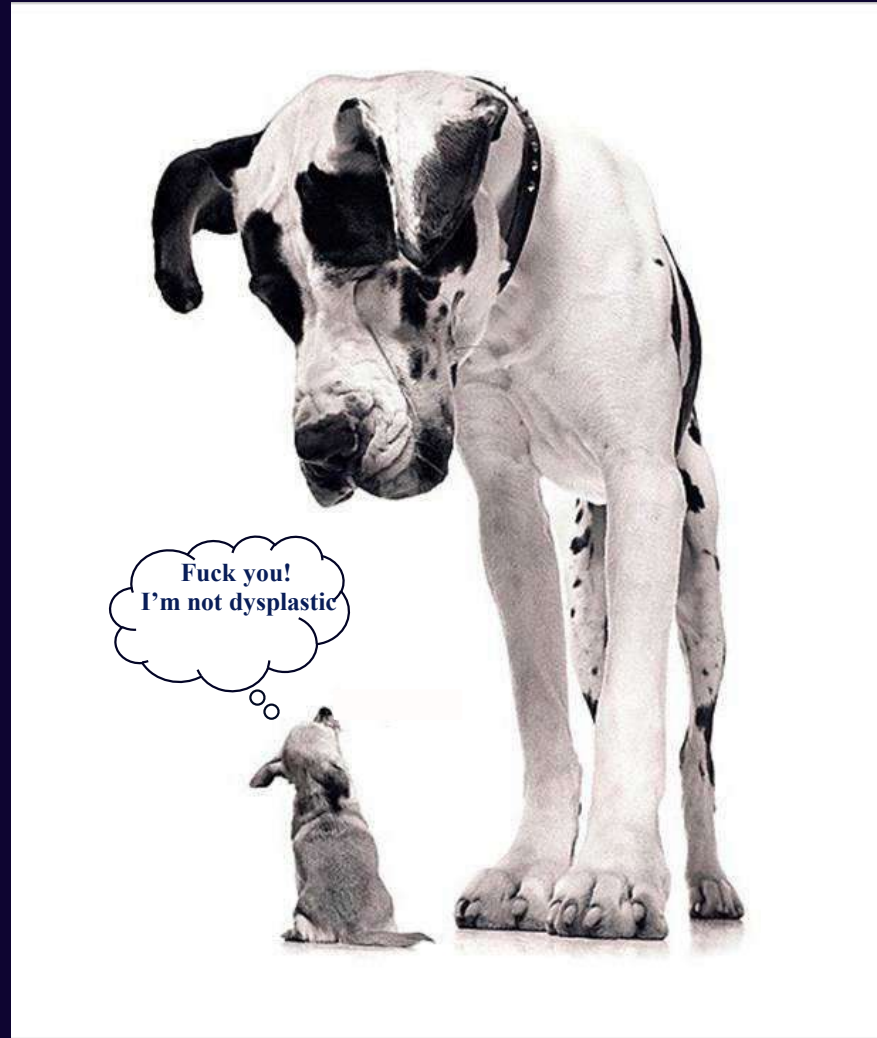
*publication of « negatives informations » on the pedigree
(if transmitted by breed club)*

*calculation and use of EBV (estimated breeding value)
(= « positive effect » individual s & « negative effect » individuals)*

LOF SELECT

*look for a specific dog results
look for progenitors
create a virtual mating*

*Thank you for
your attention*





Fleur Marie Missant

SCC Health and Genetic Resources Project Manager

Genomics as an aid to diagnosis



GENOMICS AS AN AID TO DIAGNOSIS

Tibetan Terrier Congress 2022

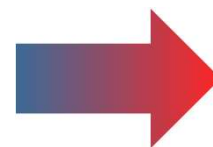
IDENTIFICATION



Identify your breeding stock
to certify the parentage and
health results

STR GENETIC IDENTIFICATION (ISAG 2006)

- Panel of 22 STR markers



Unique identification
for each dog

- International norm ISAG 2006

Certificat d'Identification Génétique

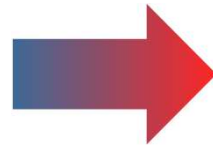
Marqueur	Allèle 1	Allèle 2	Marqueur	Allèle 1	Allèle 2
AHT121	98	102	INRA21	101	105
AHT137	141	141	INU005	124	128
AHT130	119	121	INU030	146	152
AHTh171	219	219	INU055	218	220
AHTh260	246	246	REN105L03	233	233
AHTk211	89	89	REN162C04	202	206
AHTk253	292	296	REN169D001	218	218
AMELOGENIN	Y	X	REN169O18	158	170
CXX279	124	126	REN274M23	268	272
FH2054	148	156	REN54P11	222	232
FH2848	236	240	REN64E19	145	147

NEW GENETIC IDENTIFICATION

ISAG 2020 : a new panel of markers with a new technology = genomics

Panel of 22 STR markers

Already used all around the world
Easy to find in a lot of labs



2 panels of 100 SNP markers

More precise results
The technology of tomorrow

PARENTAGE COMPATIBILITY

How does it work ?

Comparison between the DNA prints of the 2 parents and the offspring

Certificat d'Identification Génétique

Marqueur	Allèle 1	Allèle 2	Marqueur	Allèle 1	Allèle 2
AHT121	98	102	INRA21	101	105
AHT137	141	141	INU005	124	128
AHT130	119	121	INU030	146	152
AHT1171	219	219	INU055	218	220
AHT1260	246	246	REN105L03	233	233
AHT1211	89	89	REN162C04	202	206
AHT1253	292	296	REN169D001	218	218
AMELOGENIN	Y	X	REN169O18	158	170
CX1279	124	126	REN274M23	268	272
FH2064	148	156	REN54P11	222	232
FH2048	236	240	REN64E19	145	147

PARENTAGE COMPATIBILITY

How does it work ?

Comparison between the DNA prints of the 2 parents and the offspring

STR : If more than 1 marker does not fit → parentage is not validated

SNP : If more than 4 markers do not fit → parentage is not validated



You cannot compare DNA prints in the different methods

PARENTAGE COMPATIBILITY

Benefits

- Certification of the Studbook
- Selling litters with certified origins
- Genetic health test results are transmitted by heredity
- Litters with two fathers are authorized

GENETIC HEALTH TESTS

From monogenetic tests
to panels including
several tests

PANELS

A good opportunity for selection

- 1 analysis for more than 200 results
- Genetic identification
- Monogenetic results : health tests and traits
- SNP markers panel to study genetic diversity

TIBETAN TERRIER BREEDPACK

Each breed has a breedpack with genetic tests relevant for the breed

Designed by the Scientific Commission with help of the breedclub

- Genetic identification (ISAG 2020 and ISAG 2006)

Diseases :

- NCLA : Neuronal ceroid lipofuscinosis A
- PLL : Primary Lens Luxation
- PRA3 : Progressive retinal atrophy - PRA3
- RCD4 : Progressive retinal atrophy – rcd4

TIBETAN TERRIER BREEDPACK

Coat color genes :

- LocA : Agouti
- LocB : Black or Brown
- LocEx : Extension
- Lock : Dominant black
- LocS : White
- Raly : tan markings

Coat texture :

- LocC : Curly coat
- LocIC : Furnishing

→ 12 gene tests results + genetic identification for each dog

A practical tool for breeders

TIBETAN TERRIER RESULTS IN FRANCE

➤ NCLA : Neuronal ceroid lipofuscinosis A

Number of tested dogs	NCLA clear	NCLA carrier	NCLA affected
127	120	6	1

➤ PLL : Primary Lens Luxation

Number of tested dogs (genetic test)	PLL clear	PLL carrier	PLL affected
127	103	24	0

Number of tested dogs (clinical test)	PLL clear	PLL affected
153	153	0

TIBETAN TERRIER RESULTS IN FRANCE

➤ PRA3 : Progressive retinal atrophy - PRA3

Number of tested dogs	PRA3 clear	PRA3 carrier	PRA3 affected
115	115	0	0

➤ RCD4 : Progressive retinal atrophy – rcd4

Number of tested dogs	rcd4 clear	rcd4 carrier	rcd4 affected
123	87	35	1

→ Would it be possible to compare with other countries ?

TIBETAN TERRIER RESULTS IN FRANCE



LA SANTE

TERRIER TIBETAIN

GÈNES D'INTÉRÊT

	2021		2020		2019		2018		2017	
	Nbre	%	Nbre	%	Nbre	%	Nbre	%	Nbre	%
LocB-B/B	30	94%	9	90%	6	100%	1	100%	0	0%
LocB-B/b	2	6%	0	0%	0	0%	0	0%	0	0%
LocB-b/b	0	0%	0	0%	0	0%	0	0%	0	0%
LocB-B/b_b/b	0	0%	1	10%	0	0%	0	0%	0	0%
LocB-B/B_B/b_b/b	0	0%	0	0%	0	0%	0	0%	0	0%
TOTAL LocB	32		10		6		1		0	

HETEROZYGOSITY

What is this rate ?

- Reality of the inbreeding coefficient
- Should be as high as possible

Breed	Number of dogs tested	Mean of heterozygosity rate
Berger australien	472	38%
Chien de berger belge	246	37%
Golden Retriever	216	31%
Berger américain miniature	158	41%
Staffordshire Bull terrier	158	32%
Chien de berger des Shetland	154	33%
Cocker spaniel anglais	129	32%
Retriever du Labrador	129	33%
Cavalier King Charles	97	26%
Tibetan Terrier	20	36%

USING THE RESULTS IN SELECTION

Official results are
written on the pedigrees
and used for cotation

REGISTERING HEALTH DATA

Database

- Registering clinical and genetic results
- Data is collected through breeders, owners, breedclubs, vets
- Can be used for selection with displaying of information on our online database, but also for research purpose

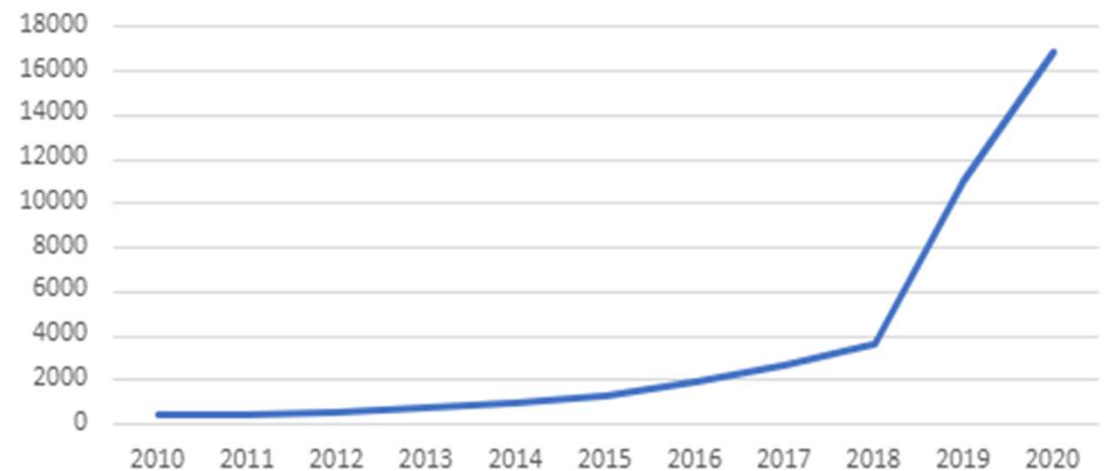
Population data

- Focus on diseases expressed in our population
- Identify new diseases in a breed
- Research projects to identify genes

REGISTERING HEALTH DATA

- Free
 - Registering the results is not mandatory
- Engage in a positive communication about selection on health


Number of test results registered by year



REGISTERING SYSTEM

For each breed and each disease (and the associated mutation), the Scientific Commission determines the level :

Maladie suivie (important disease)	→	Results are on the pedigree and on LOF Select
Maladie sous surveillance (under surveillance)	→	Results are on LOF Select
Maladie émergente ou potentiellement émergente (potentially emerging)	→	Results are not shown




Registering a result does not mean it is shown


OUR PEDIGREE

The official document


- Only important diseases
- Gives all information at first glance



CENTRALE
CANINE



Membre de
la Fédération
Cynologique
Internationale



Membre de la
section
Europe de la FCI

LIVRE DES ORIGINES FRANÇAIS

Reconnu par le ministère de l'Agriculture comme Livre Généalogique de l'espèce canine (doit obligatoirement être remis en même temps que le chien en cas de changement de propriétaires)

LIVRE D'ÉLEVAGE DE LA SCC

EVEREST DE LA LISIERE SOLOGNOTE

TECKEL A POIL DUR
Fau.Cha.Mar.Fau. - Standard - Poil Dur

Mâle Né(e) le : 27/04/2009
LOF 4 TEC. 215793/31608 250269801365449 - 2FPC730
Inscrit(e) le : 30/06/2009

Cot.4 PRA-0(11) CACS(1) EXCChNE TAN SCHWHK/40 SP ChT VP

ANCÊTRE(S) COMMUN(S) : COEFFICIENT DE CONSANGUINITE: 3%
SUDEBOK PORTOS 4, 3 (SUR 5 GENERATIONS POUR
IDYLL 4, 3 LES ASCENDANTS CONNUS)

Collatéraux :
ECLIPSE (F) Fau.Cha.Mar.Fau. Standard Poil Dur DNA Cot.4 PRA-0(10)
CACS(3) CACIB(1) TAN WA SCHWHN SP LST VP
EOLE (F) Fau.Cha.Mar.Fau. Standard Poil Dur Cot.4 PRA-0(10) TB ChNCP
SCHWHK/40 LST VP
EPICE (F) Fau.Cha.Mar.Fau. Standard Poil Dur Cot.3 PRA-0(10) EXC
ChNCP SCHWHK/40 ChT VP
EDEN (F) Fau.Cha.Mar.Fau. Standard Poil Dur Cot.2 TB TAN SCHWHN ST
LST VP

PRODUCTEUR
Mme CACARD DANIELLE
7 ROUTE DE LA MOTTE
18500 BERRY BOUY

PROPRIÉTAIRE
M. DU REAU DE LA GAIGNONNIERE
JEAN & MME GUILLIER GODELEINE
2 RUE DE LA MAIRIE
49250 ST REMY LA VARENNE

PROPRIÉTAIRE

Les informations relatives à chaque généteur mentionné dans la généalogie de ce document proviennent : du LOF, Livre généalogique reconnu par le Ministère de l'Agriculture comme Livre Généalogique unique de l'espèce canine et du Livre d'Élevage que la SCC a constitué en compilant les données de valorisation des généteurs.

www.centrale-canine.fr Date d'émission : 15/06/2016

ONLINE DATABASE : LOF SELECT



- Find all test results (important and under surveillance diseases) online for all dogs
- Verify the identification and parentage compatibility
- Simulation of pedigrees

Road To Asgard
With Ragnar des
Joyaux de Luna
Berger Australien ♂

Coefficient de consanguinité **0.00%**

Propriétaire	
Caractéristiques	Ble. Big.Noï. PBLLim.
Né(e) le	29 Octobre 2020
Numéro LOF	128121
Identifiant	250269608828923
Santé	CEA-1.1 ⓘ MDR1-1.1 ⓘ +
ADN	DNAComp-M ⓘ
Titres français	
Titres étrangers	
Père : Maps Of Little Blue Stars	1
Numéro LOF : 72463/7928	
Mère : O'treyja Lou Pastre d'Aqui	1
Numéro LOF : 98670/12554	

CEA-1.1 MDR1-1.1 CH1-MS4-A-1.1 DMHA-1.1 PRKD-1.1 HUU-1.1
DNAComp-M

ONLINE DATABASE : LOF SELECT



Road To Asgard With Ragnar des Joyaux de Luna

Berger Australien

Coefficient de
consanguinité 0.00%

- Find all test results (important and under surveillance diseases) online for all dogs
- Verify the identification and parentage compatibility
- Simulation of pedigrees

Propriétaire	
Caractéristiques	Ble, Big, Noi, PBLLim.
Né(e) le	29 Octobre 2020
Numéro LOF	128121
Identifiant	250269608828923
Santé	CEA-1.1 ⓘ MDR1-1.1 ⓘ +
ADN	DNAComp-M ⓘ
Titres français	
Titres étrangers	
Père : Maps Of Little Blue Stars	1
Numéro LOF : 72483/7928	
Mère : Ofreyja Lou Pastre d'Aqui	1
Numéro LOF : 98670/12554	
	CEA-1.1 MDR1-1.1 CAT-HSF4-A-1.1 DMIA-1.1 PRKD-1.1 HUU-1.1 DNAComp-M

MAPS OF LITTLE BLUE STARS
LOF : 72483/7928 Id : 250268712550833
Mar, PBLLim.

PRKD-1.1 DMIA-1.1 CAT-HSF4-A-1.1
MDR1-1.2 CEA-1.1

OFREYJA LOU PASTRE D'AQUI
LOF : 98670/12554 Id : 250269608828923
Ble, Big, Noi, Mar, Fau, PBLLim.

EB-0 MDR1-1.1 CAT-HSF4-A-1.1
DMIA-1.1 PRKD-1.1 CEA-1.1 HD-0
HUU-1.1 QIC-9/10 LucM-Min
LucE-EYE LucS-SYS LucB-B/B
LucK-kg/ky LucK-oh/ot
DNA

X'SELLS THE DRUMS ARE DRUMMING
LOF : Etranger Id : 276094180043435
Ble, Big, Noi, Mar, Fau, PBLLim.

CAT-HSF4-A-1.1

HUNTER BISAIDO ISLAND DE L'OREE DES
CHARMOIS
LOF : 32177/5678 Id : 250268710164228
Noi, PBLLim.

LS TWINS CREW NILES
LOF : 77348/8295 Id : 250268501143925
Noi, Mar, Fau, PBLLim.

MOIRA DI U VECCHIU
LOF : 65655/10864 Id : 250268731605744
Ble, Big, Noi, Mar, Fau, PBLLim.

TWO BY TWO'S THE PIPES ARE PIPING
LOF : Etranger
Noi, Mar, Fau, PBLLim.

HD-A
DNA

X'SELLS WHEEL-OF-FORTUNE
LOF : Etranger
Ble, Big, Noi, Mar, Fau, PBLLim.

OPALAUSSIE FOR A FIST FULL OF
DOLLARS
LOF : 24169/5526 Id : 250269201033852
Mar, Mar, Fau, PBLLim.

DNA

DEWINSLOWS
LOF : 8159/1311 Id : 250269714

DNA

LIKE A HOB OF MAGIC RIVER SONG
LOF : 59699/7216 Id : 250268500880714
Ble, Big, Noi, Mar, Fau, PBLLim.

HD-A EB-0 CAT-0 (2016)
PRA-0 (2016)

JUST FRENCHIE LOLLIPOP DES KITCHOU
PITCHOU
LOF : 52840/8916 Id : 250268712235756
Noi, Mar, Fau, PBLLim.

EVER TOGETHER OF CRYSTAL LAKE
LOF : 17344/2445 Id : 25026960269232
Noi, Mar, Fau, PBLLim.

HD-B
DNA

IMPULSE! RECORDS AFRICAN VIOLET DU
CHEMIN DE
LOF : 42739/6541 Id : 250269602235770
Ble, Big, Noi, Mar, Fau, PBLLim.

HD-A EB-0
DNAComp

ONLINE DATABASE : LOF SELECT



Road To Asgard With Ragnar des Joyaux de Luna

Berger Australien

Coefficient de
consanguinité 0.00%

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Propriétaire	
Caractéristiques	Ble, Big, Noi, PBLLim.
Né(e) le	29 Octobre 2020
Numéro LOF	128121
Identifiant	250269608828923
Santé	CEA-1.1 MDR1-1.1 +
ADN	DNAComp-M
Titres français	
Titres étrangers	
Père : Maps Of Little Blue Stars	
Numéro LOF : 72483/7928	
Mère : Ofreyja Lou Pastre d'Aqui	
Numéro LOF : 98670/12554	

CEA-1.1 MDR1-1.1 CAT-HSF4-A-1.1 DMMA-1.1 PRCD-1.1 HUU-1.1
DNAComp-M

MAPS OF LITTLE BLUE STARS
LOF : 72483/7928 Id : 250268712550853
Mar. PBLLim.

PRCD-1.1 DMMA-1.1 CAT-HSF4-A-1.1
MDR1-1.2 CEA-1.1



OFREYJA LOU PASTRE D'AQUI
LOF : 98670/12554 Id : 2502696088141591
Ble, Big, Noi, Mar, Fau, PBLLim.

EB-0 MDR1-1.1 CAT-HSF4-A-1.1
DMMA-1.1 PRCD-1.1 CEA-1.1 HD-0
HUU-1.1 QIC-0/0 LucM-Min
LucE-EYE LucS-SYS LucB-B/B
LucK-Ky/Ky LucA-0/0
DNA



X'SELLS THE DRUMS ARE DRUMMING
LOF : Etranger Id : 276094180043435
Ble, Big, Noi, Mar, Fau, PBLLim.

CAT-HSF4-A-1.1



HUNTER BISAIDO ISLAND DE L'OREE DES
CHARMOIS
LOF : 32177/5678 Id : 250268710164228
Noi, PBLLim.

LS TWINS CREW NILES
LOF : 77348/8295 Id : 250268501143925
Noi, Mar, Fau, PBLLim.

MOIRA DI U VECCHIU
LOF : 65655/10864 Id : 250268731605744
Ble, Big, Noi, Mar, Fau, PBLLim.

TWO BY TWO'S THE PIPES ARE PIPING
LOF : Etranger
Noi, Mar, Fau, PBLLim.

HD-A
DNA



X'SELLS WHEEL-OF-FORTUNE
LOF : Etranger
Ble, Big, Noi, Mar, Fau, PBLLim.

OPALAUSSIE FOR A FIST FULL OF
DOLLARS
LOF : 24169/5526 Id : 250269201033852
Mar, Mar, Fau, PBLLim.

DNA

DEWINSLOWS
LOF : 8159/1311 Id : 250269714

DNA

LIKE A HOB OF MAGIC RIVER SONG
LOF : 59699/7216 Id : 250268500880714
Ble, Big, Noi, Mar, Fau, PBLLim.

HD-A EB-0 CAT-0 (2016)
PRA-0 (2016)



JUST FRENCHIE LOLLIPOP DES KITCHOU
PITCHOU
LOF : 52840/8916 Id : 250268712235756
Noi, Mar, Fau, PBLLim.

EVER TOGETHER OF CRYSTAL LAKE
LOF : 17344/2445 Id : 250269602695232
Noi, Mar, Fau, PBLLim.

HD-B
DNA



IMPULSE! RECORDS AFRICAN VIOLET DU
CHEMIN DE
LOF : 42739/6541 Id : 25026960233770
Ble, Big, Noi, Mar, Fau, PBLLim.

HD-A EB-0
DNAComp



ONLINE DATABASE : LOF SELECT



Road To Asgard With Ragnar des Joyaux de Luna

Berger Australien

Coefficient de
consanguinité 0.00%

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Propriétaire	
Caractéristiques	Ble, Big, Noi, PBLLim.
Né(e) le	29 Octobre 2020
Numéro LOF	128121
Identifiant	250269608828923
Santé	CEA-1.1 ⓘ MDR1-1.1 ⓘ +
ADN	DNAComp-M ⓘ
Titres français	
Titres étrangers	
Père : Maps Of Little Blue Stars	1
Mère : Ofreyja Lou Pastre d'Aqui	1
	CEA-1.1 MDR1-1.1 CAT-HSF4-A-1.1 DMHA-1.1 PRCD-1.1 HUU-1.1
	DNAComp-M

MAPS OF LITTLE BLUE STARS
LOF : 72483/7928 Id : 250268712550833
Mar. PBLLim.

PRCD-1.1 DMHA-1.1 CAT-HSF4-A-1.1
MDR1-1.2 CEA-1.1

XSELLS THE DRUMS ARE DRUMMING
LOF : Etranger Id : 276094180043435
Ble, Big, Noi, Mar, Fau, PBLLim.

CAT-HSF4-A-1.1

TWO BY TWO'S THE PIPES ARE PIPING
LOF : Etranger
Noi, Mar, Fau, PBLLim.

HD-A
DNA

XSELLS WHEEL-OF-FORTUNE
LOF : Etranger
Ble, Big, Noi, Mar, Fau, PBLLim.

HUNTER BISAIDO ISLAND DE L'OREE DES
CHARMOIS
LOF : 32177/5678 Id : 250268710164228
Noi, PBLLim.

OPALAUSSIE FOR A FIST FULL OF
DOLLARS
LOF : 24169/5526 Id : 250269201033852
Mar, Mar, Fau, PBLLim.

HD-A
DNA

DEWINSLOWS
LOF : 8159/1311 Id : 250269201033852
Mar, Mar, Fau, PBLLim.

HD-A
DNA

OFREYJA LOU PASTRE D'AQUI
LOF : 98670/12554 Id : 250269608141591
Ble, Big, Noi, Mar, Fau, PBLLim.

EB-0 MDR1-1.1 CAT-HSF4-A-1.1
DMHA-1.1 PRCD-1.1 CEA-1.1 HD-0
HUU-1.1 QIC-0/0 Lucif-Min
Lucif-EYE Lucif-SYS Lucif-B/B
Lucif-Hy/Hy Lucif-0/0
DNA

LS TWINS CREW NILES
LOF : 77348/8295 Id : 250268501143925
Noi, Mar, Fau, PBLLim.

LIKE A HOB OF MAGIC RIVER SONG
LOF : 59699/7216 Id : 250268500880714
Ble, Big, Noi, Mar, Fau, PBLLim.

HD-A EB-0 CAT-0 (2016)
PRA-0 (2016)

JUST FRENCHIE LOLLIPOP DES KITCHOU
PITCHOU
LOF : 52840/8916 Id : 250268712235756
Noi, Mar, Fau, PBLLim.

MOIRA DI U VECCHIU
LOF : 65655/10864 Id : 250268731605744
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Noi, Mar, Fau, PBLLim.

HD-B
DNA

IMPULSE! RECORDS AFRICAN VIOLET DU
CHEMIN DE
LOF : 42739/6541 Id : 250269602337770
Ble, Big, Noi, Mar, Fau, PBLLim.

HD-A EB-0
DNAComp

SELECTION GRID

Cotation from 1 to 6

Includes health test : clinical and genetic results

→ Gives the breeding value of a dog



Recommandé



4 points / 6	
RECOMMANDE	
Sujet CONFIRME	
+	
4 EXC en SPE ou RE ou CHPT ou NE (dont 2 en CI ou CO ou CCH)	
sous 3 juges différents dont 1 en CHPT ou NE	
+	
TAN	
+	
CAT	
+	
Tests ADN (PRA RCD4, PRA 3, PLL, NCL/CCL)	
+	
Dysplasie de la hanche : lecture A, B ou C	
+	
Pedigree complet	
+	
Identification ADN	



CLEAR BY PARENTAGE

- When the parentage is genetically certified
- And the 2 parents are clear for a disease
- Then the offspring is automatically clear for this disease « clear by parentage »
- Calculated on 3 generations

INTERNATIONAL CONSENSUS ?

Why ?

- To ease the use of imported dogs
- To have a larger population to work on

Dog organizations

- FCI – Fédération Cynologique Internationale
- National Kennel Clubs



Vet organizations

- WSAVA – World Small Animal Veterinary Association
- OFA – Orthopedic Foundation for Animals



INTERNATIONAL CONSENSUS ?

International Partnership for Dogs (IPFD)

Worldwide organization with :

- Breeders,
- Vets,
- Geneticists,
- Kennel Clubs,
- ...

Goals of IPFD

- Help harmonise the use of genetic tests
- HGTD – Information pages on :
 - The labs who provide genetic tests
 - Which test is relevant for each breed

DogWellNet
IPFD 

Harmonization of
Genetic Testing
for Dogs



Genetic tests is a useful tool

It is worth the investment when we talk about breeding stock

Helps selection

Genomics (SNP) is the future of genetics

A close-up photograph of a dog's face, showing its eyes, ears, and fur texture. The dog has dark fur around its eyes and ears, and lighter fur on its face.

**INTERNATIONAL COLLABORATION IS
KEY TO A BETTER SELECTION OF THE
BREED**



Any
question ?

THANKS FOR YOUR ATTENTION !

Fleur-Marie Missant – fleur-marie.missant@centrale-canine.fr



Dr Daniel Combarros

Lecturer at the Veterinary school of Toulouse

**Itching : understanding it,
treating it, prevent it**

My Tibetan Terrier is itchy... is this atopic dermatitis?

Daniel Combarros, Dipl.ECVD

European Specialist in Veterinary Dermatology

Service de dermatologie, Université de Toulouse, ENVT

Infinity, Université de Toulouse, INSERM, ENVT



 **@dani.derm**
daniel.combarros@envt.fr



- 2021... call from Ms. Estru
 - Dermatological condition in Tibetan Terriers
 - Chronic issue and therapy
 - Worldwide problem



- Not many in Toulouse... other regions?
 - Call to colleagues
 - Itch, pododermatitis, otitis...
 - Very predisposed to atopic dermatitis



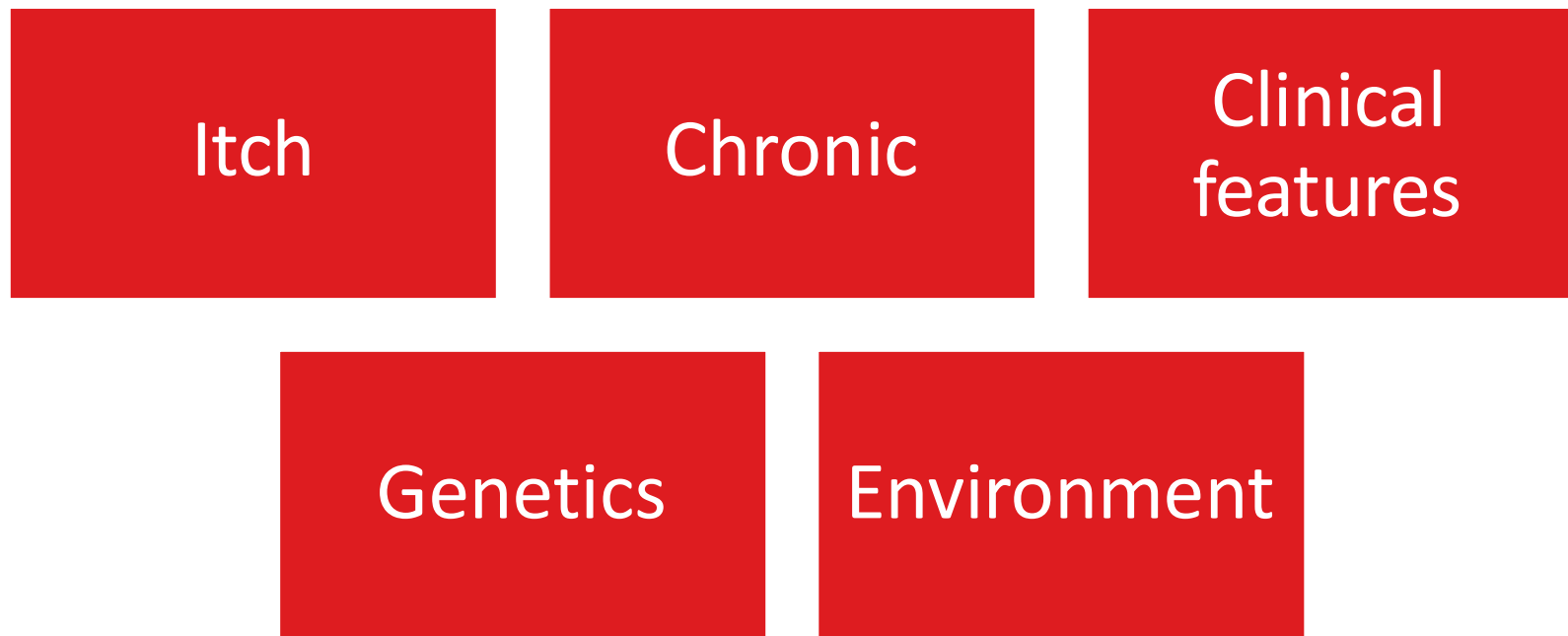
@dani.derm

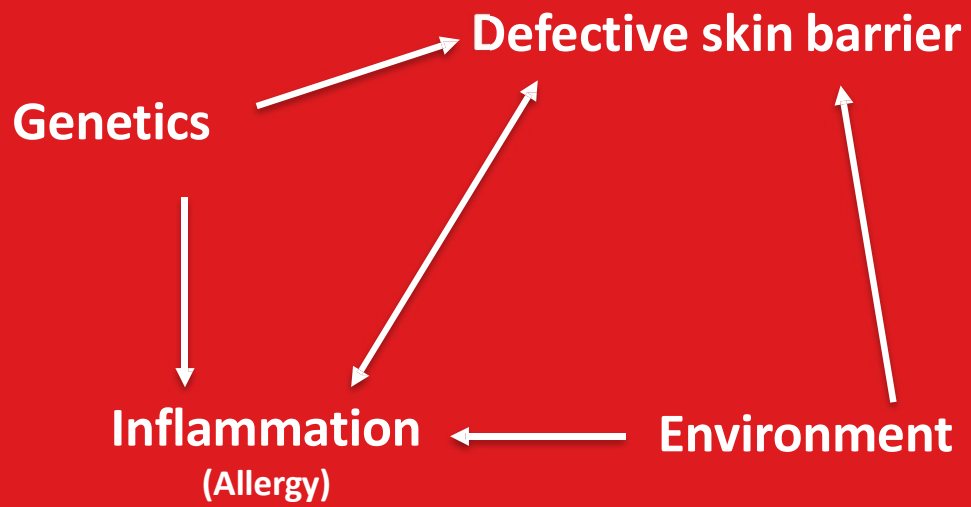
- 1 – What is this atopic dermatitis?
- 2 – Is my dog suffering from atopic dermatitis?
- 3 – Can it be prevented?
- 4 – What is the treatment of atopic dermatitis?

1

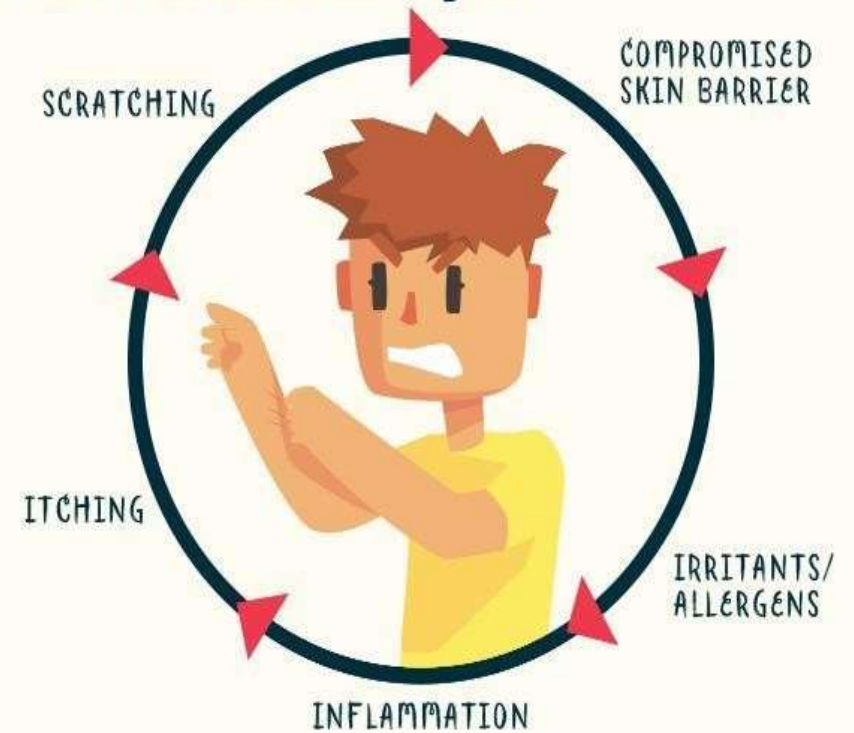
WHAT IS ATOPIC DERMATITIS?

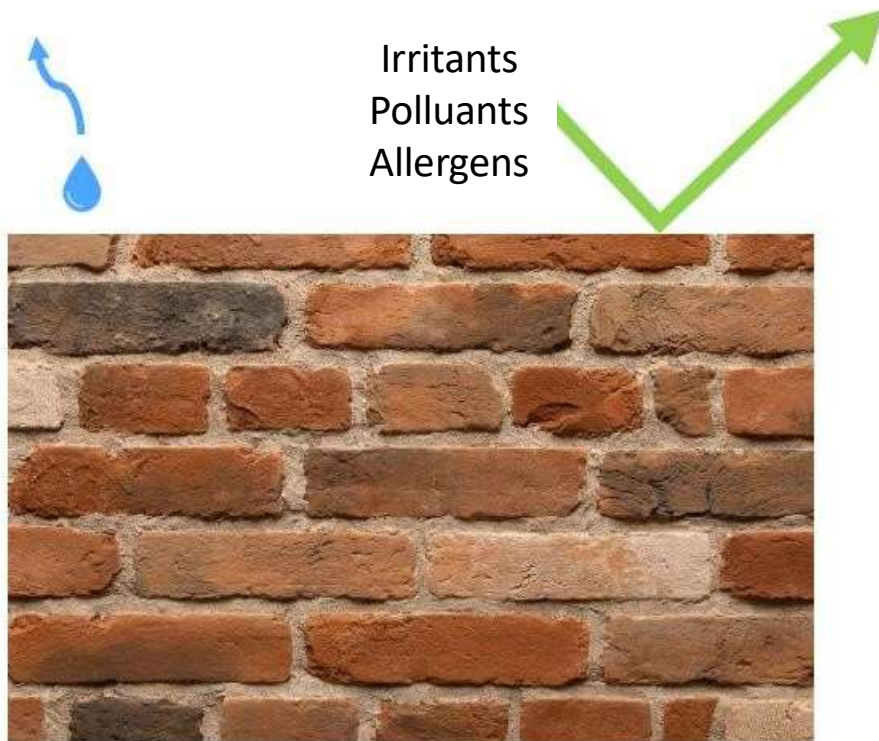
- A common, chronic, genetically predisposed, inflammatory and pruritic (itch) skin disease with characteristic clinical features, commonly associated with the presence of antibodies against environmental allergens (allergies)



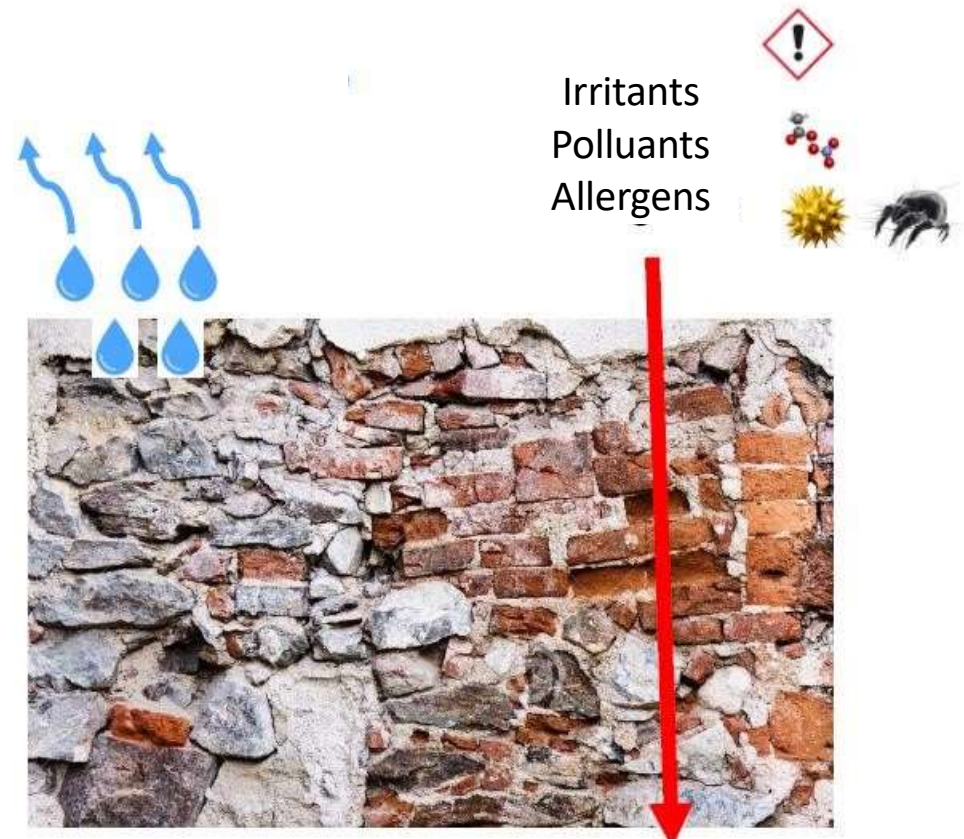


The itch-scratch cycle





IMPERMEABLE Skin



Skin is DRY and POROUS

Environment influence

Increased risk



Cities



High density

Reduced risk



Rural areas



Countryside walks



Other animals

Dog



Human

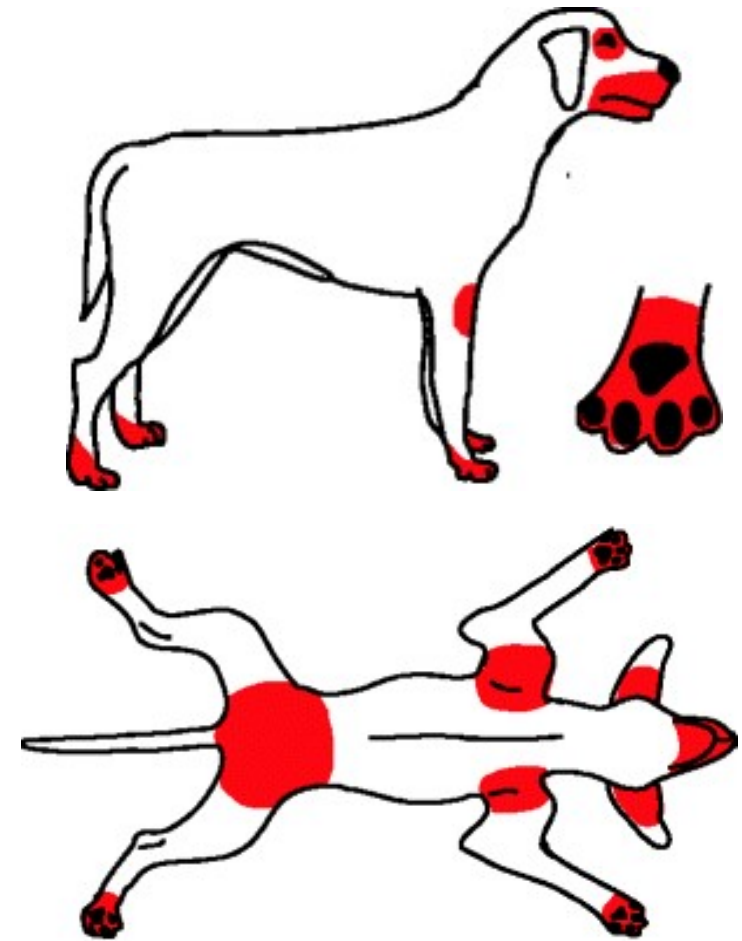


(Marsella *et al*, 2017)

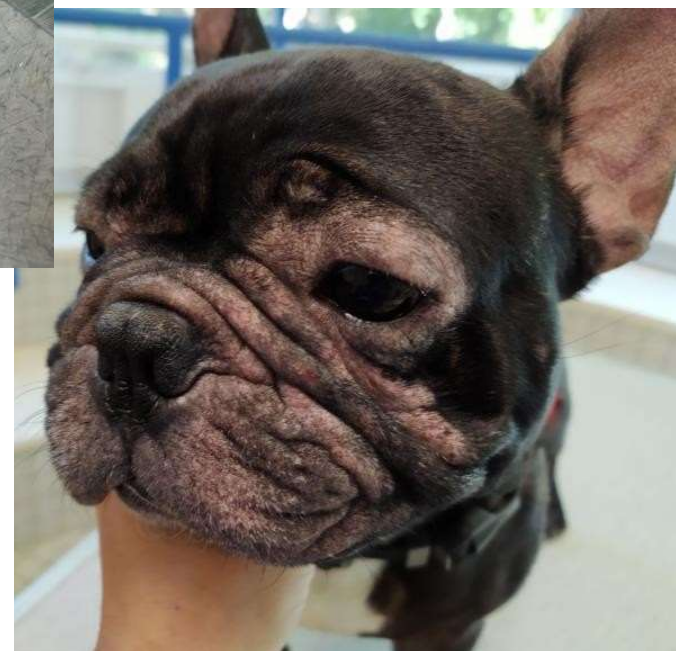
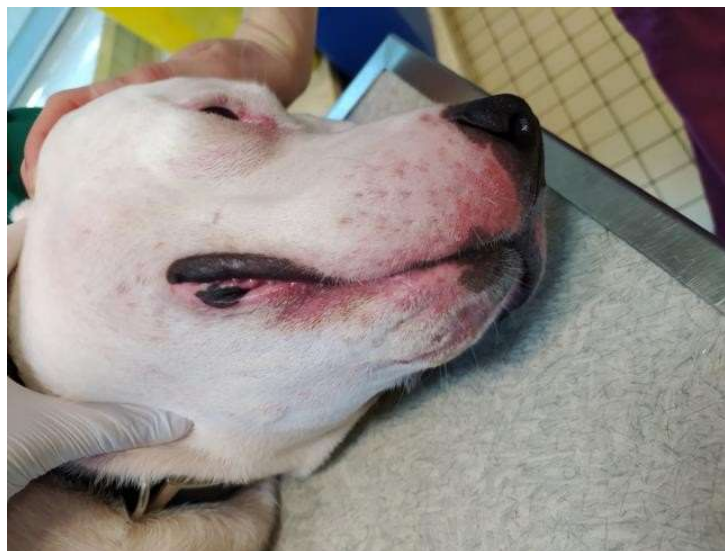
2

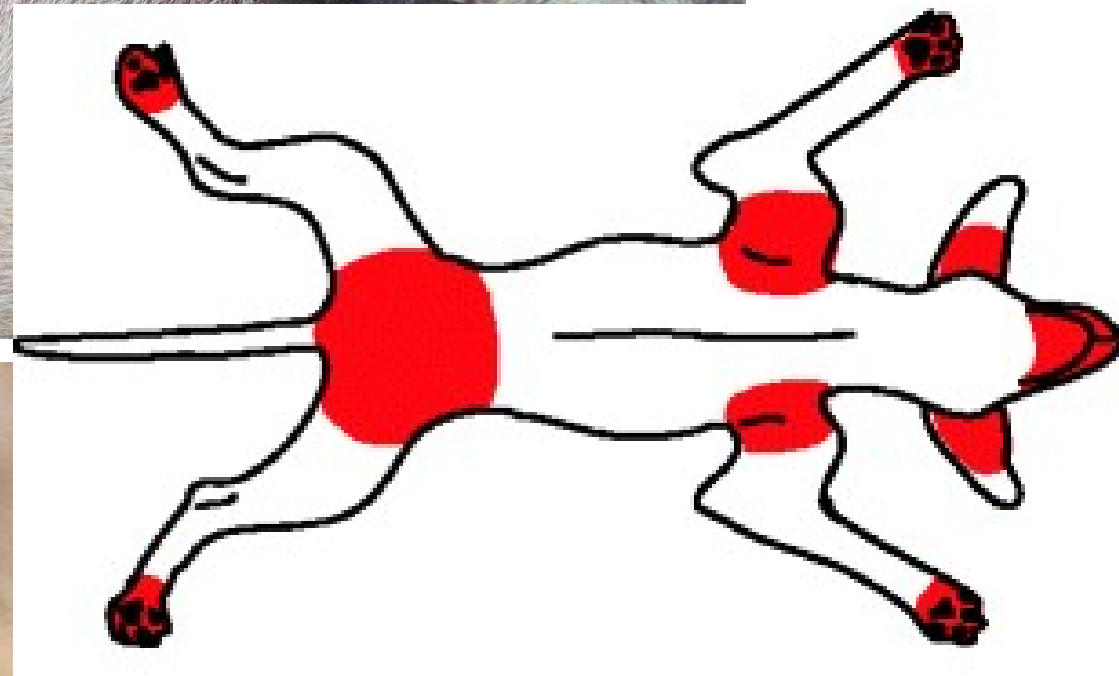
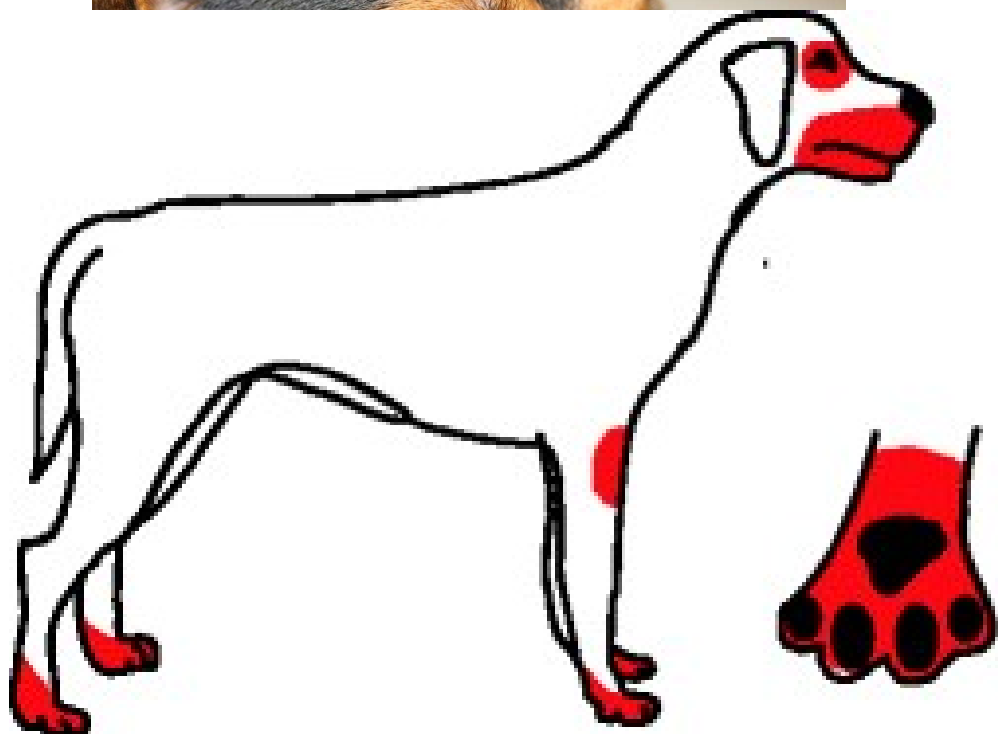
IS MY DOG SUFFERING FROM ATOPIC DERMATITIS?

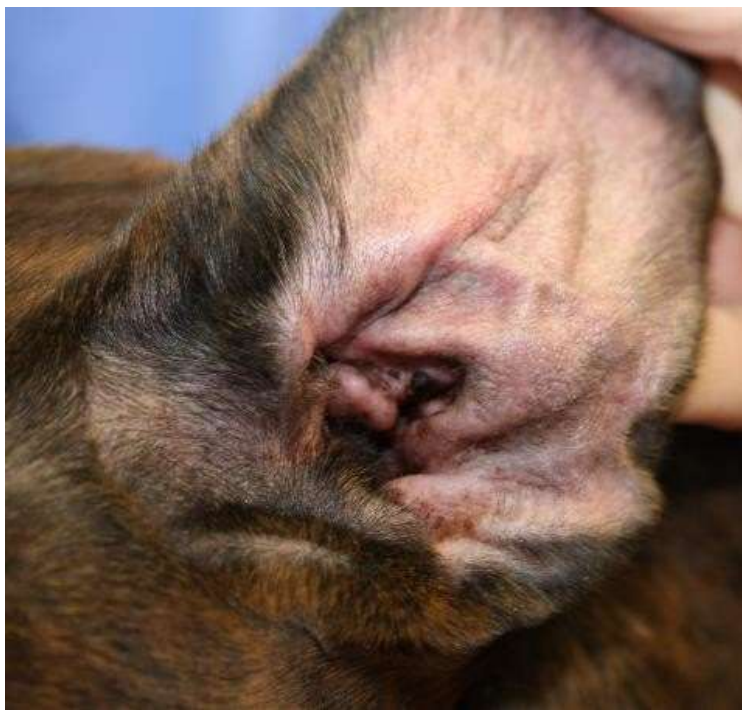
- Probably yes if...
 - The itch started before 3 years of age
 - Initial itch without lesions
 - Affected front feet
 - Recurrent otitis
 - The itch is responsive to glucocorticoids
 - Dog lives mostly indoors
 - Non affected: dorsolumbar area, ear margins

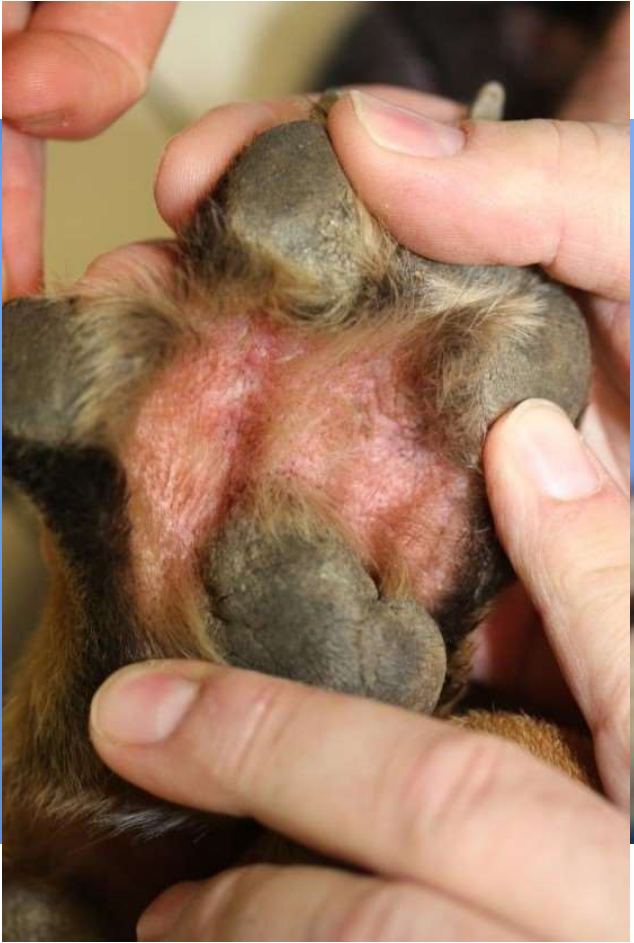


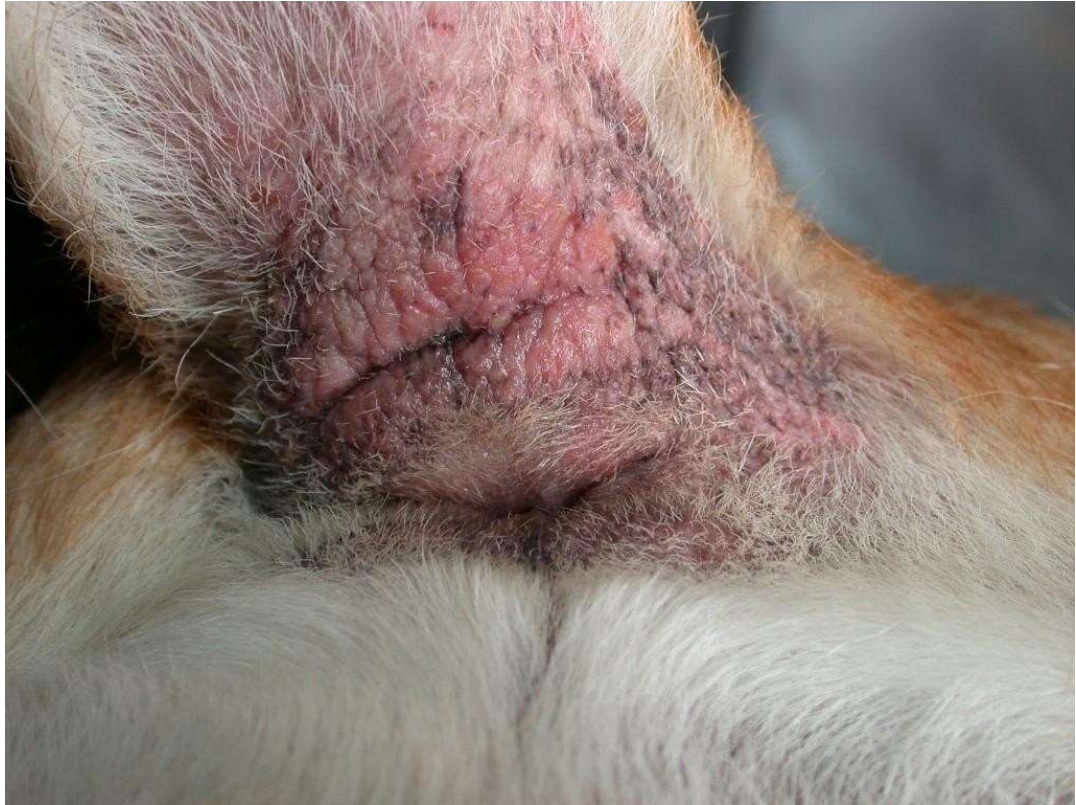












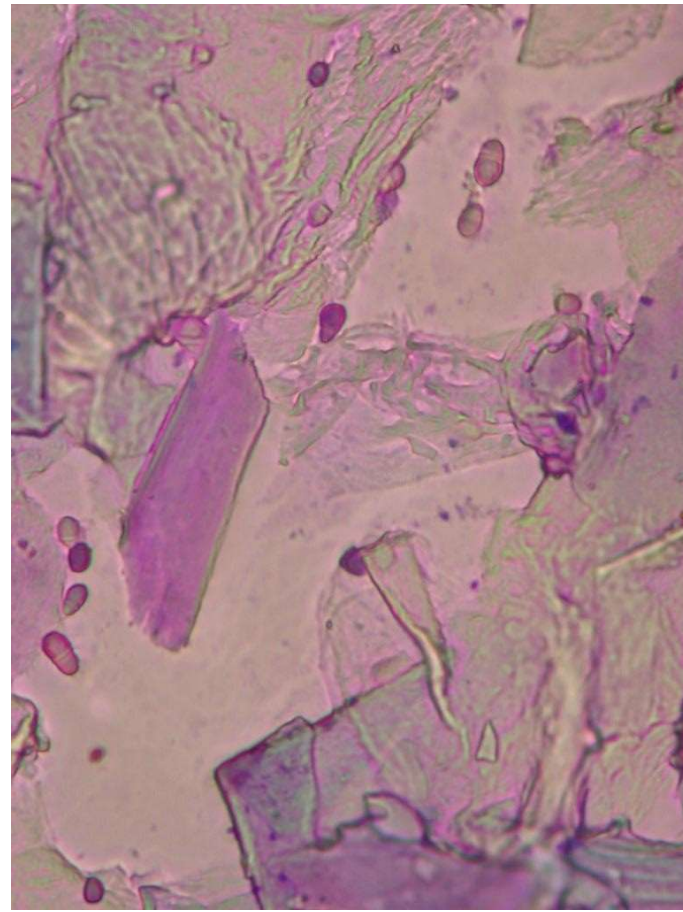
Bacterial folliculitis



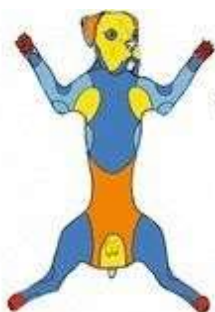
Bacterial overgrowth



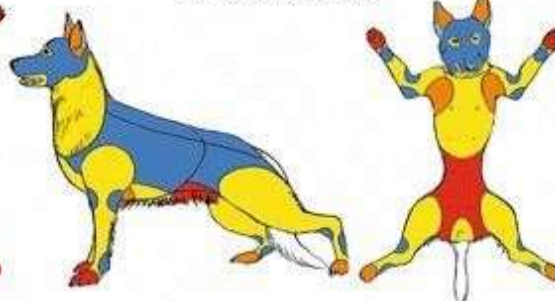
Malassezia dermatitis



Boxer



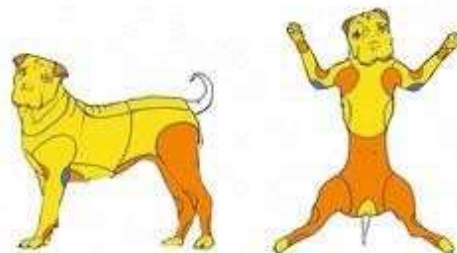
German shepherd dog



Golden retriever



Shar-pei



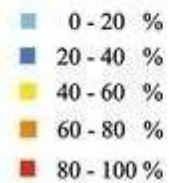
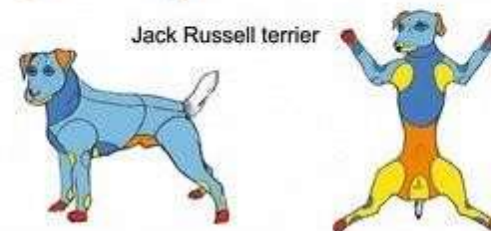
French bulldog



West Highland terrier



Jack Russell terrier



Marcel Kovalik

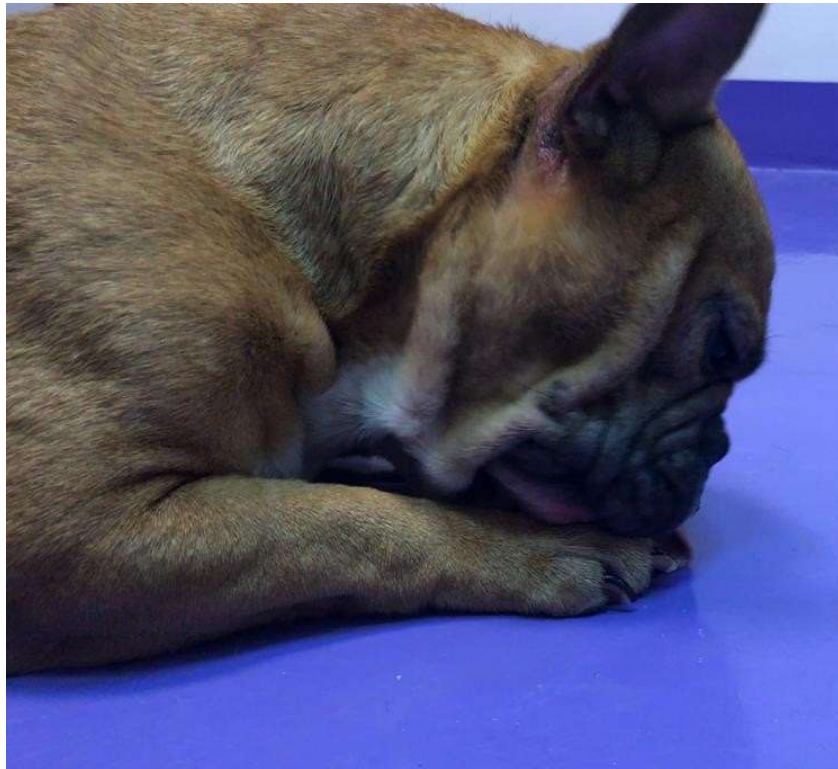
Otitis



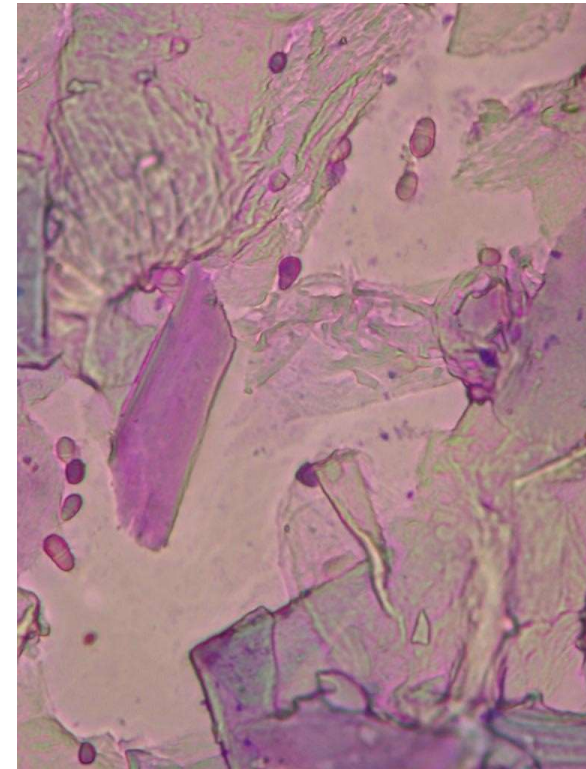
Otitis



Pododermatitis



Malassezia



Sarcoptic mange (scabies)



Flea bite hypersensitivity



MSD Vet Manual



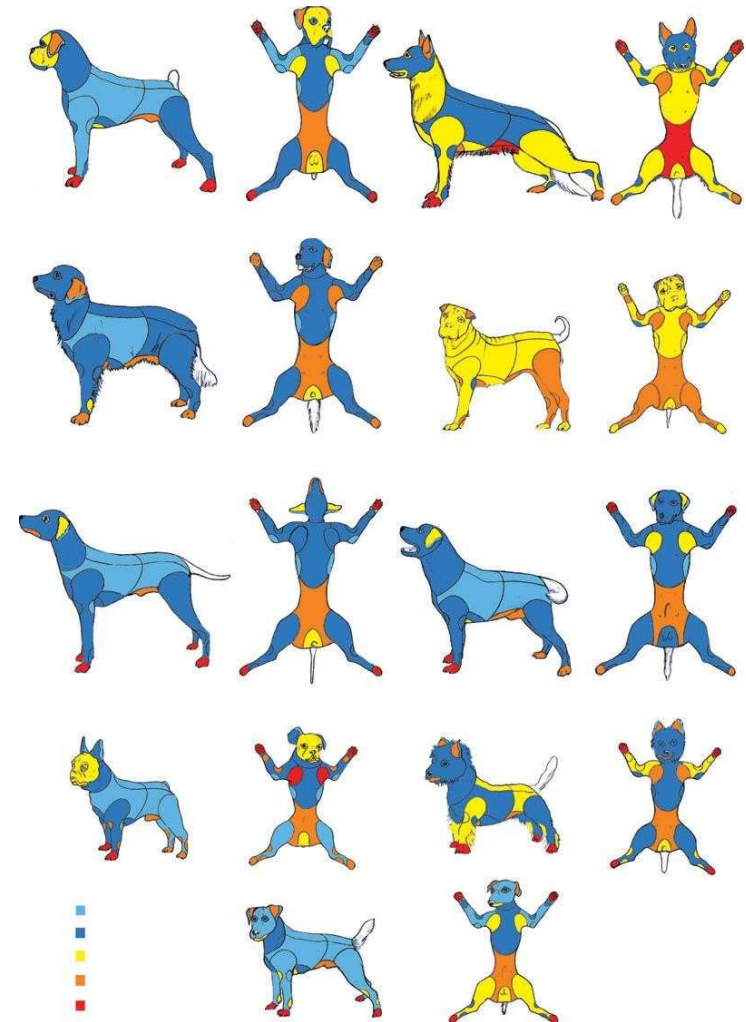
Zinc responsive dermatitis



3

CAN ATOPIC DERMATITIS BE PREVENTED?

- Prevalence very high in some breeds → genetics
 - Heritability
 - 0.47 Labradors
 - 0.31 WHWT
- No single gene! Multigenetic disease...
 - Immunity response
 - TSLP R (several breeds)
 - PTPN22 (WHWT)
 - Skin barrier
 - PKP2 (GSD)





- NO! AND PROBABLY THERE WILL NEVER BE!!
 - No a single gene but many
 - Gene combinations
 - Different genes depending on breed
 - Not a single study about genetics of AD in
- Tibetan terriers

Veterinary Dermatology




Vet Dermatol 2015; 26: 95–e26

DOI: 10.1111/vde.12198

Review: Role of genetics and the environment in the pathogenesis of canine atopic dermatitis

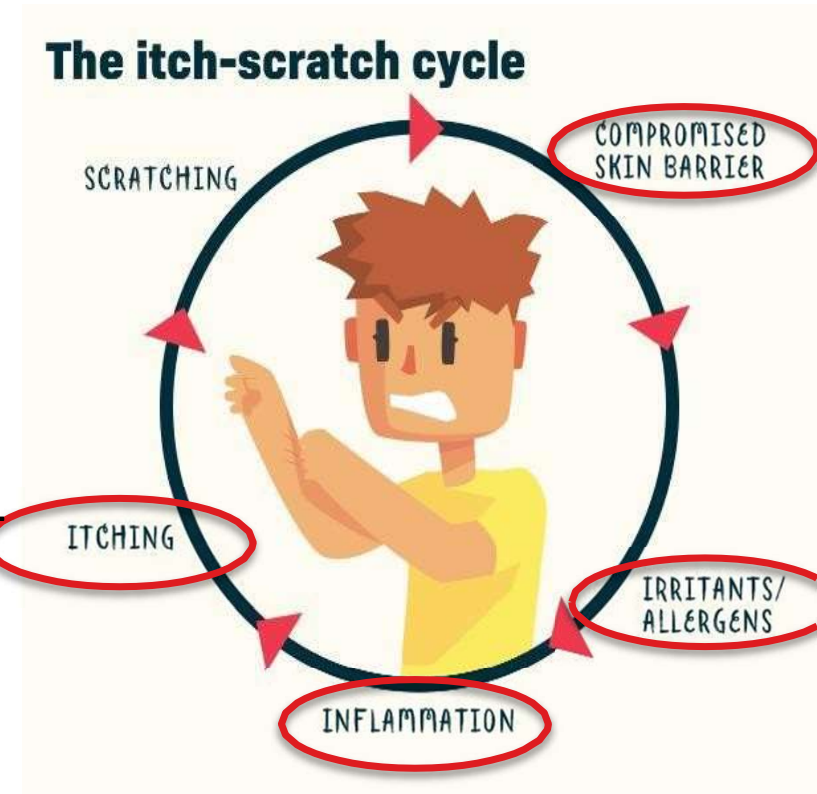
Petra Bizikova*, Cherie M. Pucheu-Haston†, Melissa N. C. Eisenschenk‡, Rosanna Marsella§, Tim Nuttall¶ and Domenico Santoro§

- What we know (study in labradors):
 - Risk of having an atopic dog is...
 - Greater if both parents have AD
 - Moderate if only one parent
 - Lowest if neither parent
- **Excluding atopic dogs from breeding will decrease the prevalence**
 -  Progressively (asymptomatic dogs can carry susceptibility genes)
 - Problem → not possible if too many affected (French Bulldog)...

4

HOW IS ATOPIC DERMATITIS TREATED?

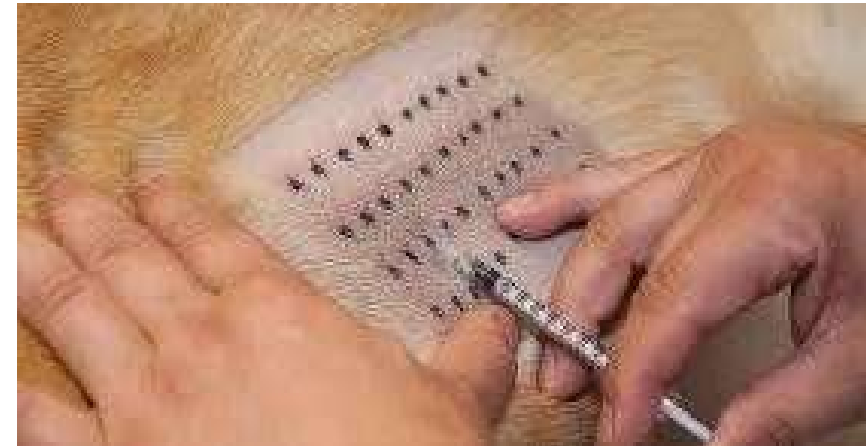
- **CHRONIC life-long disease!**
 - **No cure!**
 - Chronic treatment
 - Objective
 - Control the disease
 - Quality of life (dog, owner)
 - Minimal treatment
- Multifactorial disease → **MULTIMODAL TREATMENT**
 - Many treatment possibilities (no perfect one)
 - Combination
 - **Each animal is different**



- **Shampoos**
 - Reduce allergen concentration on skin
 - Restore skin barrier - moisturizer
 - Treat/prevent skin infection
- **Flea prevention**
 - Systematic! All year around
 - If flea bites → flares/ destabilization!



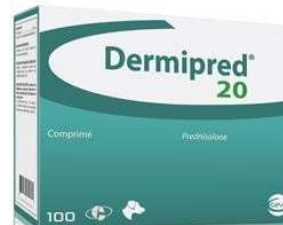
- Find the allergen that trigger the disease
 - Food → hypoallergenic diets (no blood test!)
 - Environment
 - Blood tests
 - Intradermal tests
- If the environmental allergen is found
 - Immunotherapy: long-term injections
 - Calm down the immune system
 - ONLY **SPECIFIC** treatment



Control inflammation/itch

- Topical: Dermo-glucocorticoids
- Systemic:
 - Glucocorticoids
 - Ciclosporin (Atopica[®], Cyclavance[®], Modulis[®])
 - Oclacitinib (Apoquel[®])
 - Lokivetmab (Cytopoint[®])

General principle → **minimal effective dose**



- Very frequent disease! (many breeds)
- Chronic, lifelong, non curable
- Very complex → defective skin barrier and hyper-reactive immune system
- No genetic test but possibility of excluding animals from breeding
- Many treatments available → multimodal → minimal effective dose




Article

Multiplex Cytokine Analyses in Ear Canals of Dogs Suggest Involvement of IL-8 Chemokine in Atopic Otitis and Otodectic Mange—Preliminary Results

Line-Alice Lecru¹, Daniel Combarros^{1,2}, Fabien Moog¹, Lukrecija Marinovic¹, Jevgenija Kondratjeva¹, Nicolas Amalric³, Charline Pressanti¹ and Marie Christine Cadiergues^{1,2,*} 

Review


Clinical Guidelines for the Use of Antipruritic Drugs in the Control of the Most Frequent Pruritic Skin Diseases in Dogs

Vincent Bruet¹, Marion Mosca², Amaury Briand³ , Patrick Bourdeau⁴, Didier Pin² , Noëlle Cochet-Faivre^{3,5} and Marie-Christine Cadiergues^{6,7,*} 

RESEARCH ARTICLE

Open Access

Non-controlled, open-label clinical trial to assess the effectiveness of a dietetic food on pruritus and dermatologic scoring in atopic dogs

Angela Witzel-Rollins^{1*} , Maryanne Murphy¹, Iveta Becvarova², Stephen R. Werre³, Marie-Christine Cadiergues⁴ and Hein Meyer²











Veterinary Dermatology

Vet Dermatol 2021; 32: 625–e167

DOI: 10.1111/vde.13010

Survey of cytokines on ocular surfaces of atopic dogs by multiplex analysis using two sampling methods – a pilot study

Charline Pressanti^{*†} , Elodie Ravailhe^{*}, Jessie Castellote-Brun^{*} , Nicolas Amalric[§] , Line-Alice Lecru^{*} , Jevgenija Kondratjeva^{*} , Fabien Moog^{*} , Daniel Combarros^{*†} , Jean-Yves Douet^{*†} 

Refined Immunochemical Characterization in Healthy Dog Skin of the Epidermal Cornification Proteins, Filaggrin, and Corneodesmosin

REVIEW

 OPEN ACCESS

Update on canine filaggrin: a review



Daniel Combarros^{a,b} , Marie-Christine Cadiergues^{a,b}  and Michel Simon^a 

Veterinary Dermatology

Vet Dermatol 2021; 32: 625–e167

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Dermatology service of the National Veterinary School of Toulouse

Marie-Christine Cadiergues

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Round table - Discussion

Tibetan terrier World Congress



Mark James / Glenn Davies

Waterley kennel

**Tibetan terriers, A passion,
knowledge and understanding**

Tibetan terrier World Congress



Dr Mike Tempest

Mikudi kennel

An analysis of the 2019 genetics paper
and what it means for the breed

ADDRESSING TOPICAL ISSUES

Analysis of the 2019 scientific paper

**“POPULATION STRUCTURE AND GENETIC HISTORY
OF TIBETAN TERRIERS”**

by

M Janeš, M Zorc, V Cubric-Curik, I Curik and P Dovc
(University of Zagreb, Croatia and University of Ljubljana, Slovenia)

Genetics Selection Evolution (2019) 51:79

<https://doi.org.10.1186/s12711-019-0520-4>

What did the study do?

- **It tested if the original TT belonged to a group of ancient dog breeds of Asian origin**
- **It tested if the TT belonged to the group of terrier breeds**
- **It compared the current Western and Native populations**
 - **It compared two lineages: ‘Lamleh’ and ‘Luneville’**

Some abbreviations used in the study

- **TTLA = ‘Lamleh’**
- **TTLU = ‘Luneville’**
- **TT(WP) = Western Population = TTLA + TTLU**
 - **TTNA = Native population in Tibet**
- **TTF1 = 1st generation cross = TTNA (50%NA) x TTLA (50%LA)**
- **TTBC2 = 2nd generation backcross = TTF1 (25%NA) x TTLA (75%LA)**
- **TTBC3 = 3rd generation backcross = TTBC2 (12½%NA) x TTLA (87 ½%)**

How many animals were DNA sampled in the study?

- TTLA = 20 at dog shows or directly by breeders/owners
- TTLU = 4 at dog shows or directly by breeders/owners
 - TT(WP) = 24 registered with FCI
 - TTNA = 22 at 22 locations in Tibet
 - TTF1 = 8
 - TTBC2 = 6
 - TTBC3 = 4
- **TOTAL = 64**

How was the study done?

Employed several genetic analytical techniques

Main two techniques were:

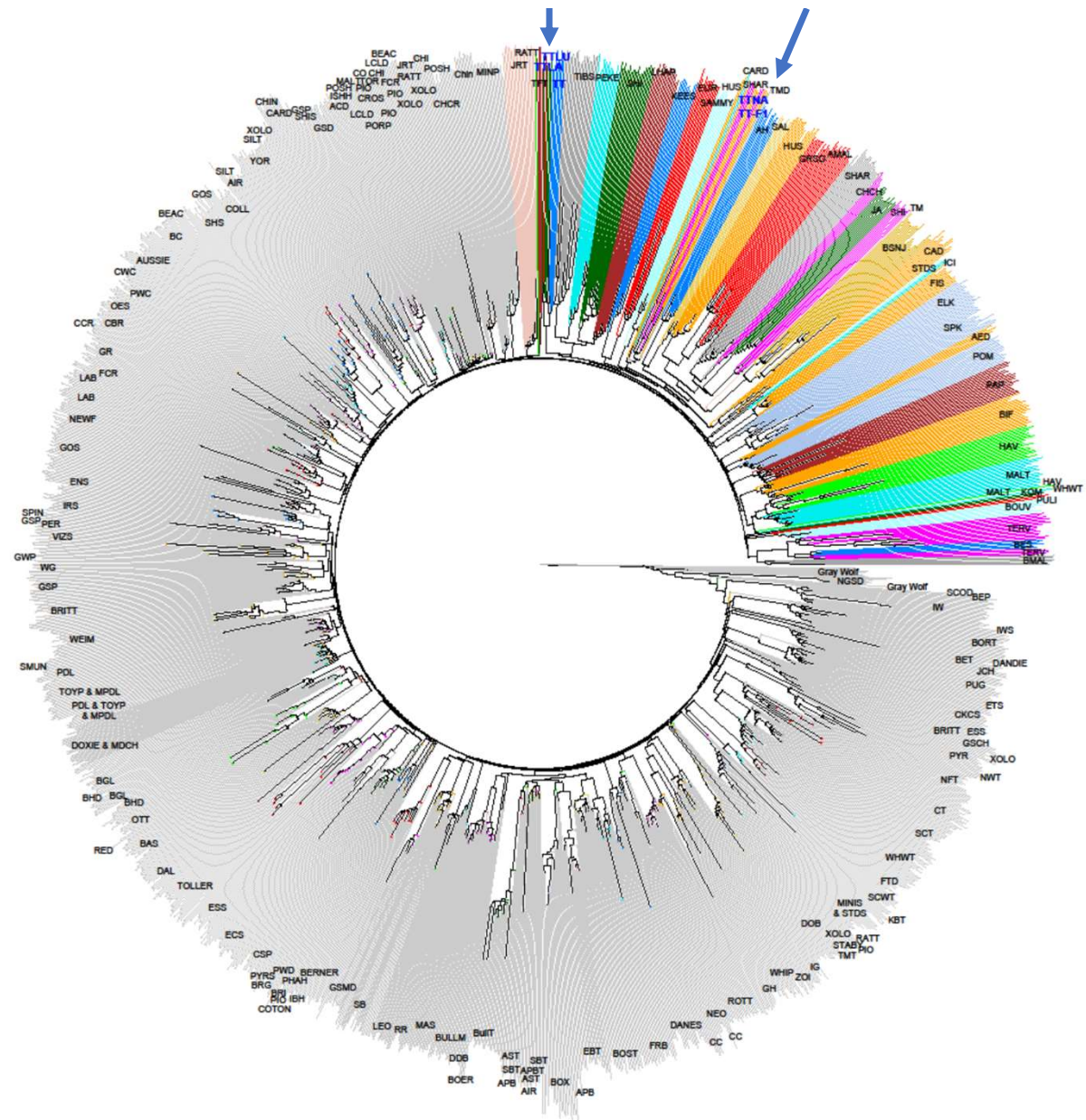
(1) Neighbor-joining tree

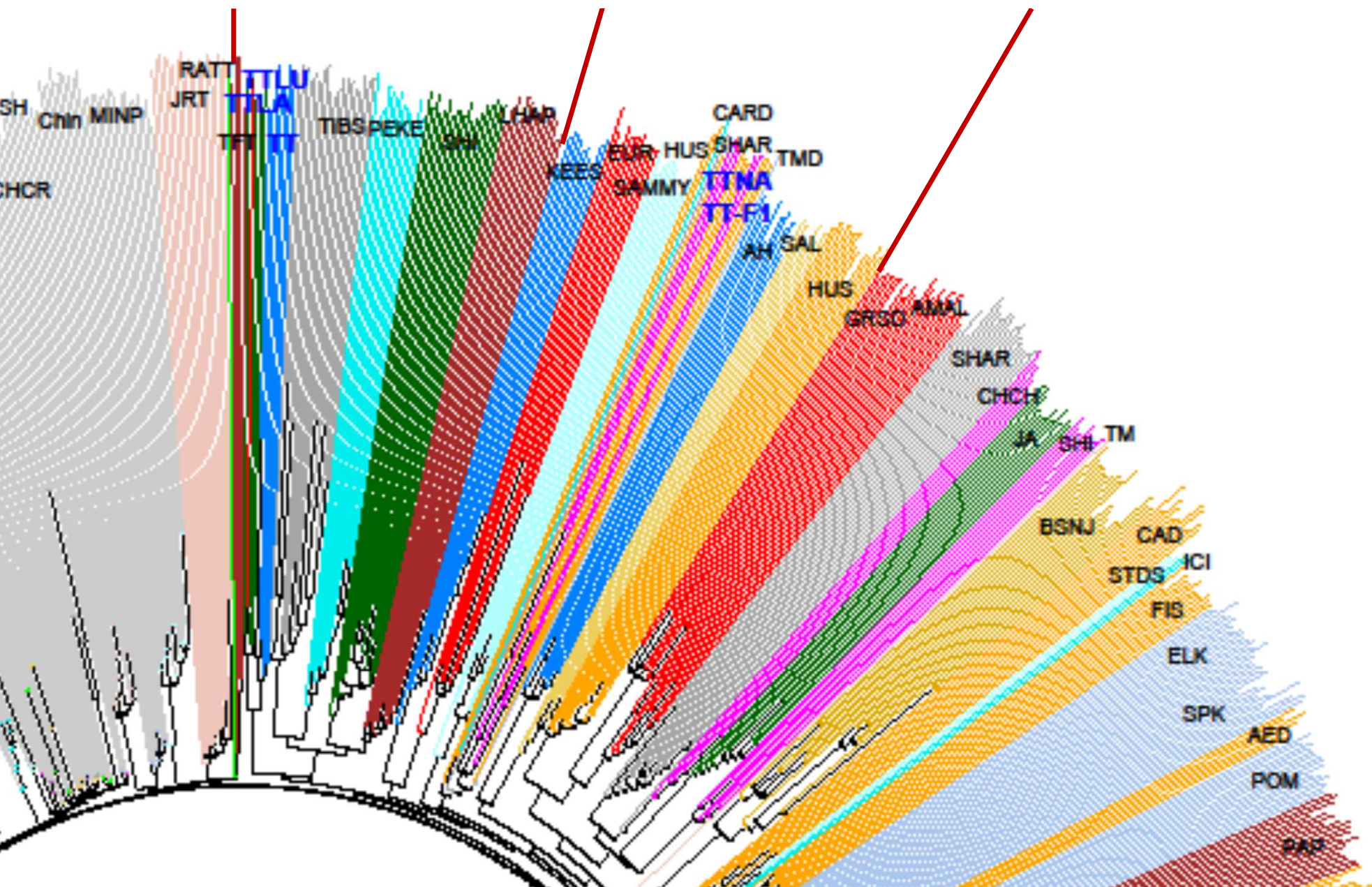
(2) NeighborNet

(1) Neighbor-joining tree

Computes **genetic distances** between 161 dog breeds/strains

Where do TTs fit in?





Results from (1) Neighbor-joining tree

TTs were in two clusters

TTNA and TTF1 (50% NA) are grouped with a
Cluster of Ancient Asian Dog Breeds
which included AH, SAL, SAMMY, HUS (2)

and TTLA, TTLU, TTWP are grouped in a
Tibetan Companion Dog Cluster
which included TIBS, PEKE, SHI, LHAP

Results from (1) Neighbor-joining tree

Most importantly:

**There was no genetic distance between TTLA & TTLU
LA & LU lineages are genetically similar**

**There was a small genetic distance between TTWP & TTNA
Current WP is slightly different from current NA**

Results from (1) Neighbor-joining tree

BUT

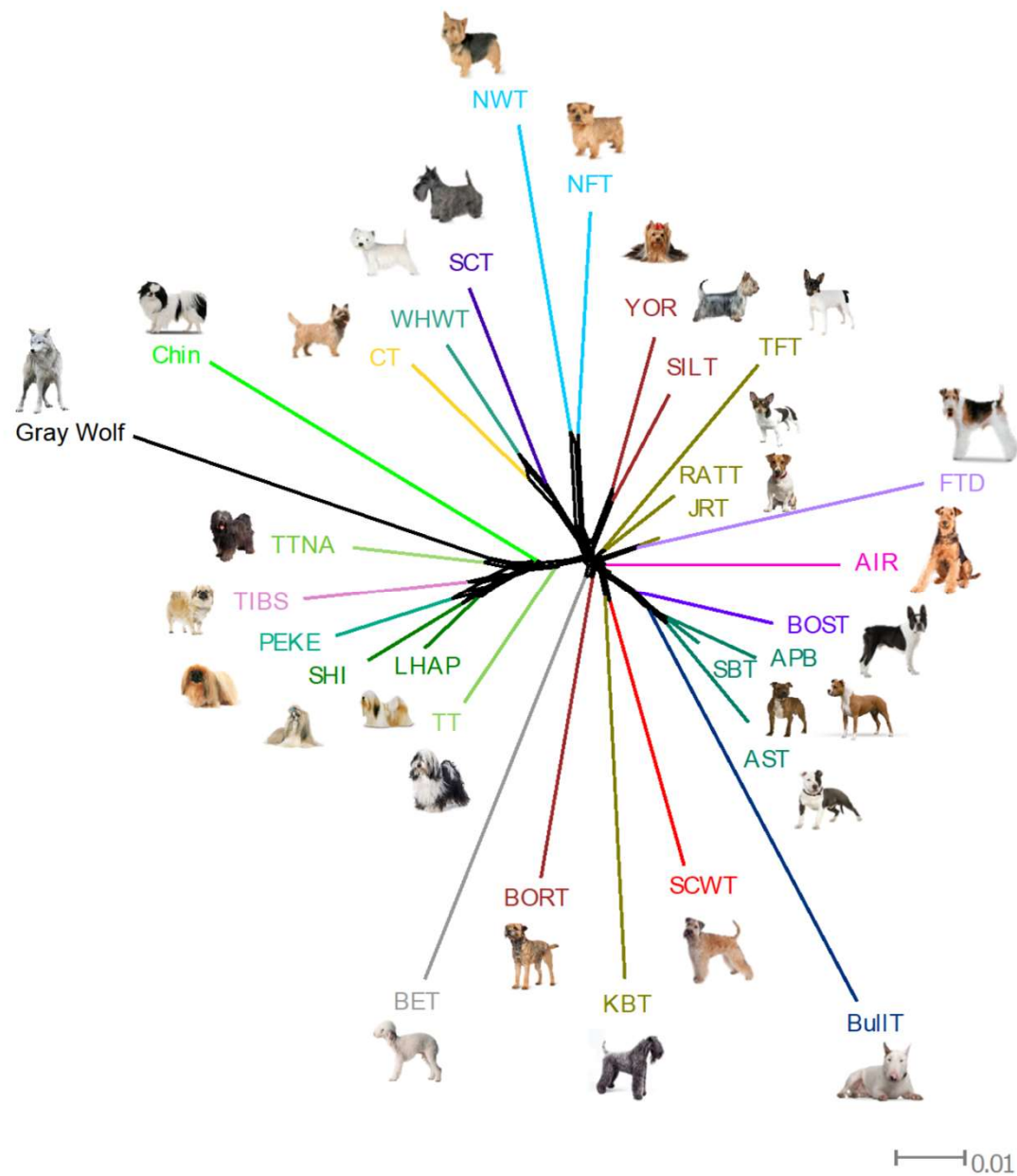
**TTWP (TTLA + TTLU)
showed some relationship with the
group of Terrier breeds**

**TTWP showed some sporadic contacts may have occurred
between TTWP and some Terrier breeds
during the last century**

(2) NeighborNet

**Computed phylogenetic relationships
between TTs and 27 dog breeds and Grey Wolf**

Where do TTs fit in?



Results from (2) NeighborNet

This clearly showed Terrier breeds formed a group on the other side of the network separate from all the TT.

This confirmed that TTs are not Terriers.

It also showed that TTNA branch is closer to the Grey Wolf than any other breed.

The TT is a very ancient breed.

BUT the edges between TTNA and TIBS, PEKE, SHI and LHAP indicate hybridization events between them.

What answers did the study produce?

- Does the native TT belong to a group of ancient dog breeds of Asian origin? **YES**
 - Does the TT belong to the group of terrier breeds?
NO
- How do the current Western and Native populations compare?
SLIGHTLY DIFFERENT
- How do the two lineages 'Lamleh' and 'Luneville' compare?
NO GENTIC DIFFERENCE BETWEEN THEM

Why are WP and NA slightly different?

- NA has been subject to **‘genetic drift’** away from from the NA population that provided the exports of 100 years ago.
- WP experienced a **‘bottle-neck’** that made it more uniform than NA.
 - WP was **pedigree recorded and selectively bred**, NA was not pedigree recorded and was randomly bred.
- WP was **restricted to pedigree registered individuals**.
 - NA population **was open for admixtures** with phenotypically similar individuals from outside the breed

What are the implications for the breed?

To recognise now that the science tells us:

- “the WP had some sporadic contacts with Terrier breeds”
- “the NA had/has hybridization events with TIBS, PEKE, SHI and LHAP” (street dogs)
- “There has been significant gene flow from the NA population to both LA and LU lineages”

What are the implications for the breed?

The fraction of the NA genome containing homozygous regions is smaller, & heterozygous regions larger, than in the WP genome i.e. the **NA population is genetically more variable** than the WP.

The **NA is an important genetic resource** for preserving the original gene pool, and represents a 'back-up' population for the WP.

NA could be used to **increase genetic diversity** in the WP.

BUT care must be taken in selecting Native TTs that have **not been subject to hybridisation events** in Tibet.

What are the implications for the breed?

To recognise the that:

- **For ‘Lamlehs’** – “Dogs brought into the UK up until 1951 by other owners were intermingled by Dr Greig with her original imports so that today it is impossible to trace any living TT containing only Dr Greig’s own original lines”
(Angela Mulliner, 1977)
- **For ‘Lunevilles’** – they were founded on ‘Lamlehs’

**LUNEVILLE
PRINCE KHAN**

KALA KAH OF LAMLEH	LUN CHREE OF LAMLEH	CHRY-SAN OF LAMLEH
		LIT-LUN OF LAMLEH
	KAH-NA OF LAMLEH	KALA KHRIS OF LAMLEH
		ZANA OF LATMAH
LUNEVILLE LADY PENELOPE	TROJAN KYNOS	UNKNOWN
		UNKNOWN
	PRINCESS AUREUS	PA-SANG OF LAMLEH
		PRINCESS CHAN

Major Conclusion

I presented **pedigree information** at the TT World Congress in the UK in 2017 to answer the question:

“Lamleh and Luneville, Never the Twain Shall Meet?”
and I showed from pedigrees that they had met a long time ago.

Now we have had in 2019 **scientific information** confirming that Lamleh and Luneville are genetically basically the same.

WE ARE ONE



Round table

Standards and question about the breed

**Brian Harris – Mike Tempest – Mark James
- Sabine Schiratti - Lydie Estru – Gauthier
Lequain**

Voilà, c'est fini.....

Thank you !



Hope you had a nice TT World Congress.

It was such a pleasure to welcome you.

Rendez-vous au prochain congrès !