



**PATHOLOGICAL PROBLEMS
IN THE RACING SLED DOG:
DID WE FAIL SOMEWHERE?**

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Alfort School of Veterinary Medicine (France)
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**RACING SLED DOGS SPORT MEDICINE
QUITE ALWAYS FACE THE SAME PROBLEMS**

JOINTS
TRAUMAS
FEET
DIGESTIVE TRACT
METAB
MUSCLE
RESPI




**BUT APPROACH AND TREATMENTS CAN GREATLY
VARY FROM ONE RACE TO ANOTHER, AND MORE
EXCHANGES BETWEEN RACES WOULD BE A PLUS,
EVEN IF ISDVMA EXISTS...**





**RACING SLED DOGS SPORT MEDICINE
QUITE ALWAYS FACE THE SAME PROBLEMS**




**BUT THE EVOLUTION OF THE SPORT, OF THE LEVEL
OF PERFORMANCE, OF THE WILL OF ORGANIZERS
TO HAVE MORE AND MORE TEAMS, MAKES IT A NECESSITY
FOR RACE VETERINARIANS TO EVOLUATE, DEVELOP NEW
RESEARCH PLANS, AND TO BE MORE INVOLVED IN PREVENTION...**

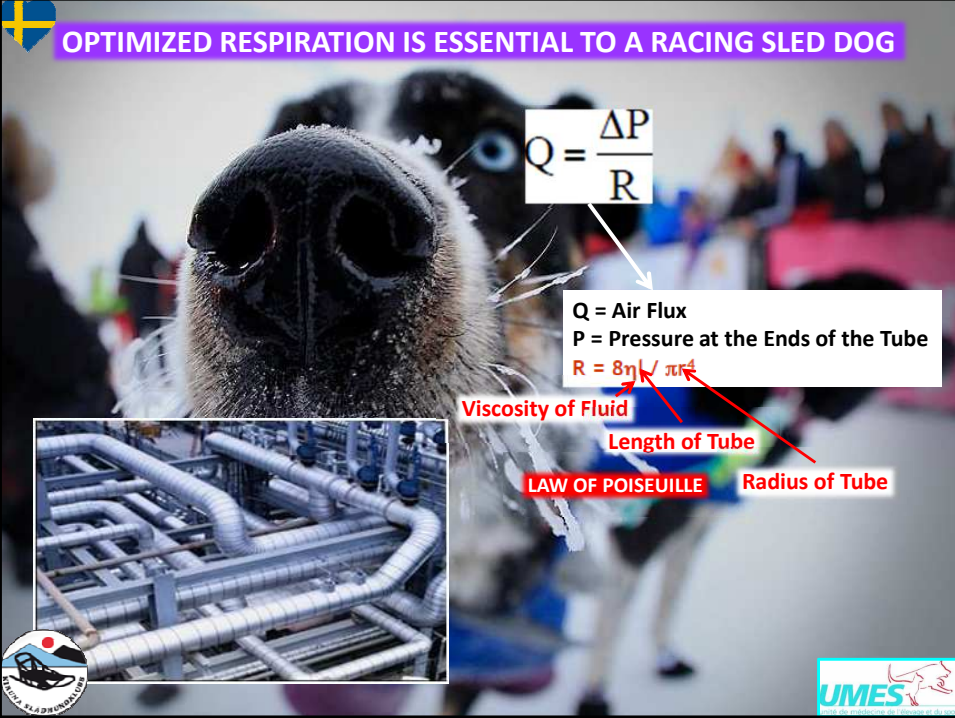


**ACTUAL PROBLEMS INCREASING THEIR
INCIDENCE OR STAGNATING**





 **OPTIMIZED RESPIRATION IS ESSENTIAL TO A RACING SLED DOG**


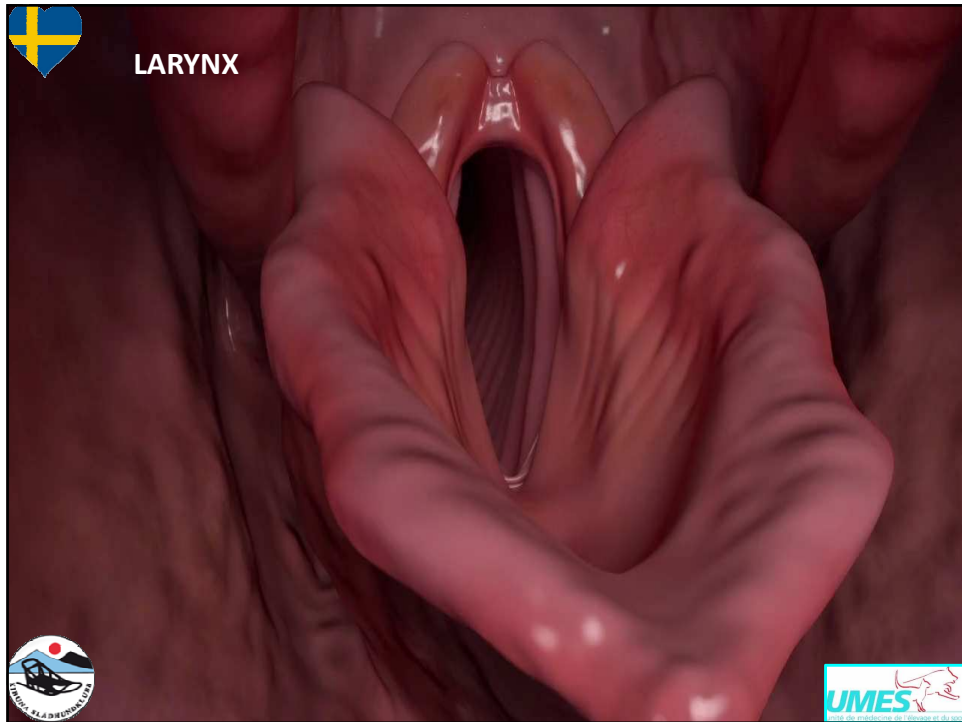


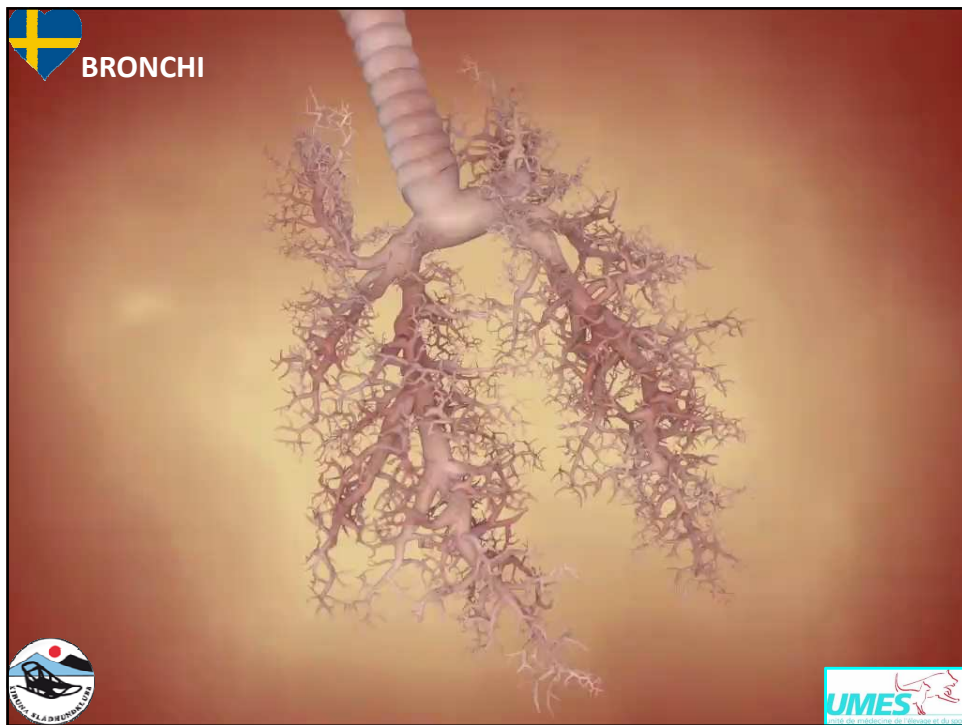
$$Q = \frac{\Delta P}{R}$$

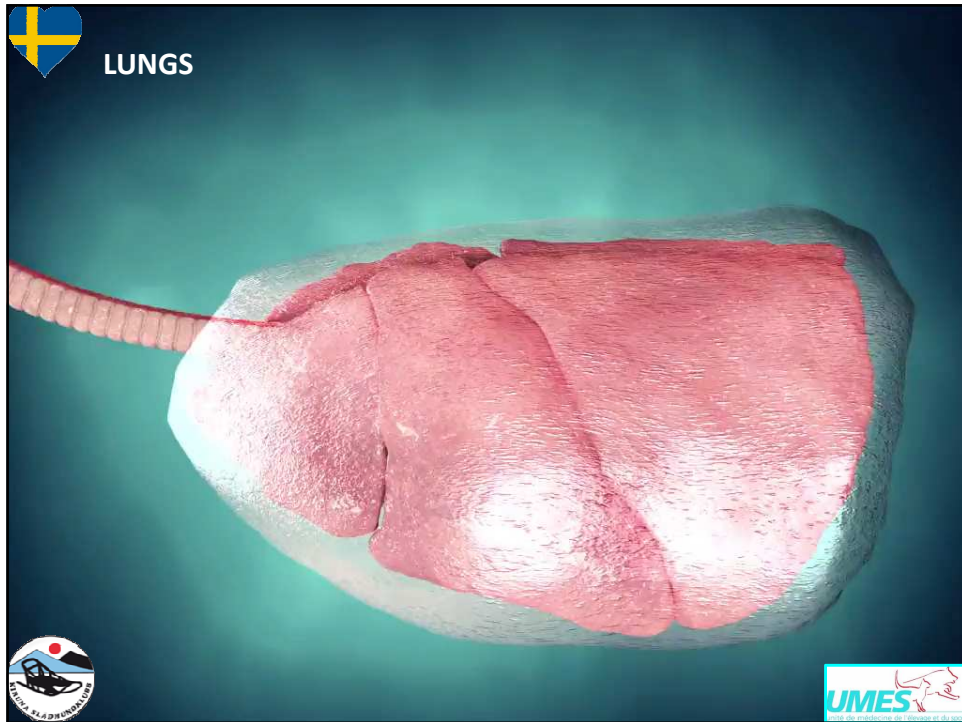
Q = Air Flux
 P = Pressure at the Ends of the Tube
 $R = \frac{8\eta l}{\pi r^4}$

Viscosity of Fluid
 Length of Tube
 Radius of Tube

LAW OF POISEUILLE





OPTIMIZED RESPIRATION IS ESSENTIAL TO A RACING SLED DOG

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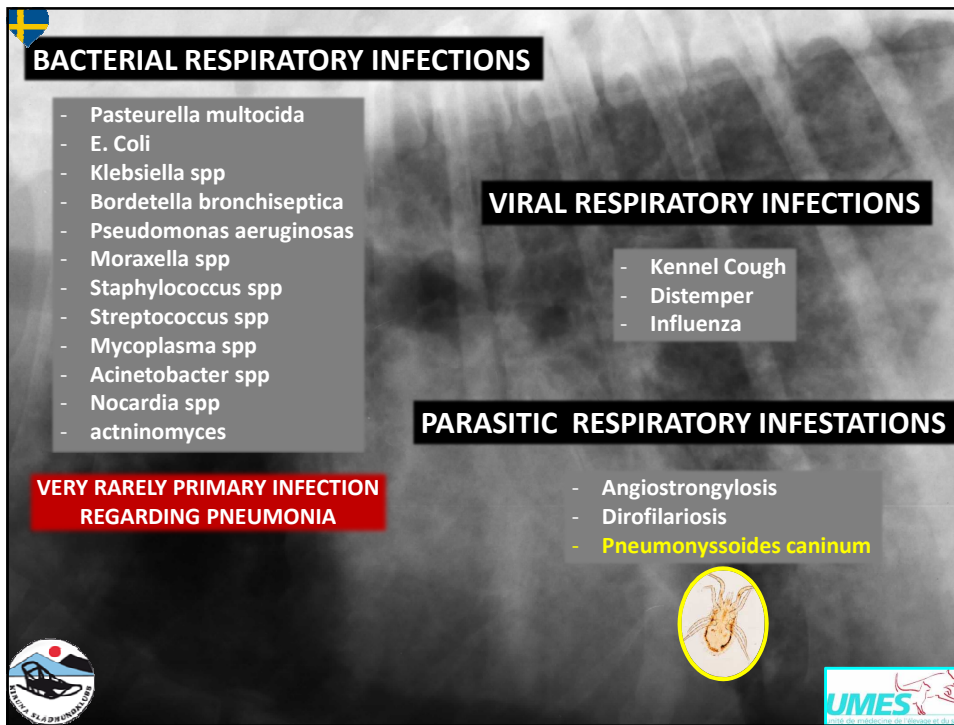
ANY CAUSE OF INCREASED VISCOSITY OF BRONCHO-TRACHEAL MUCUS AND ANY CAUSE OF TUBE DIAMETER REDUCTION WILL GENERATE :

- STAMINA INTOLERANCE
- COUGHING
- EXHAUSTION

UMES

**RESPIRATORY PROBLEMS...
SPECIFIC CAUSES ?**

**RESPIRATORY PROBLEMS...
SPECIFIC CAUSES ?**



BACTERIAL RESPIRATORY INFECTIONS

- Pasteurella multocida
- E. Coli
- Klebsiella spp
- Bordetella bronchiseptica
- Pseudomonas aeruginosas
- Moraxella spp
- Staphylococcus spp
- Streptococcus spp
- Mycoplasma spp
- Acinetobacter spp
- Nocardia spp
- actinomyces




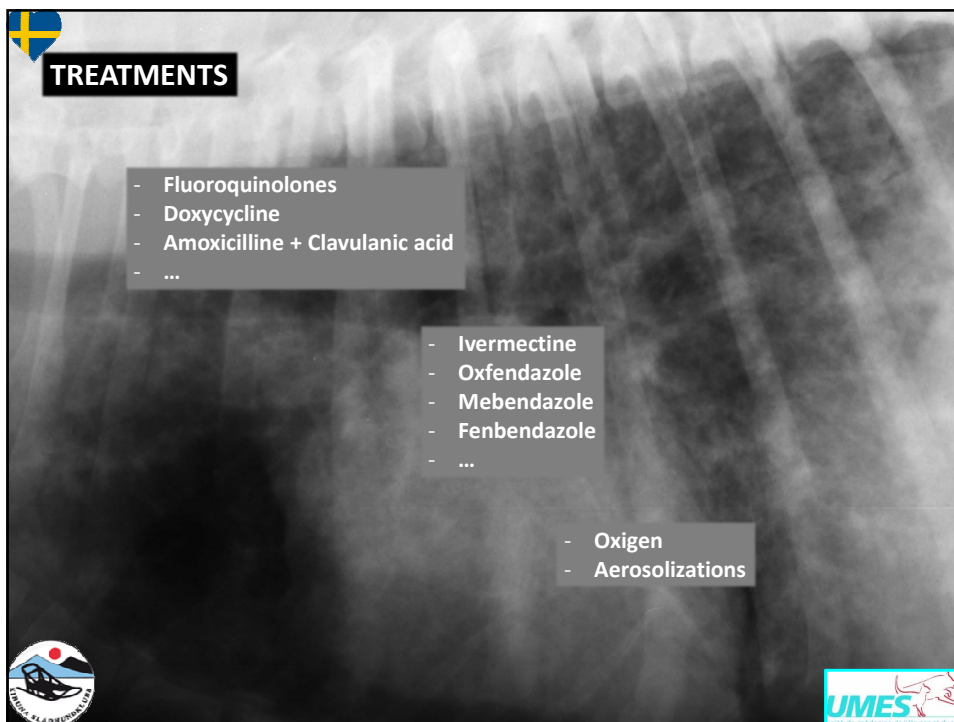
VIRAL RESPIRATORY INFECTIONS

- Kennel Cough
- Distemper
- Influenza

PARASITIC RESPIRATORY INFESTATIONS

- Angiostrongylosis
- Dirofilariosis
- **Pneumonyssoides caninum**

VERY RARELY PRIMARY INFECTION REGARDING PNEUMONIA









TREATMENTS

- Fluoroquinolones
- Doxycycline
- Amoxicilline + Clavulanic acid
- ...


- Ivermectine
- Oxfendazole
- Mebendazole
- Fenbendazole
- ...

- Oxigen
- Aerosolizations













QUESTION: WHAT ABOUT IMMUNE RESPONSE IN HIGH INTENSITY EXRCISING SLED DOGS ?

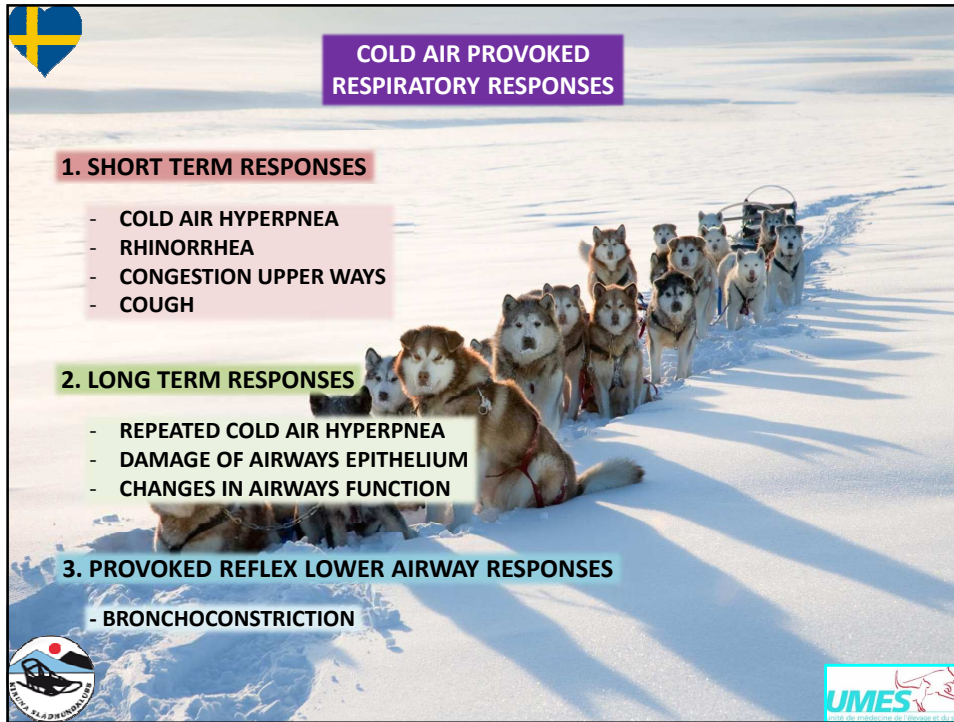


CUMULATED STRESS AND ITS CONSEQUENCES ON IMMUNITY



RESPIRATORY PROBLEMS... SPECIFIC CAUSES ?





COLD AIR PROVOKED RESPIRATORY RESPONSES

1. SHORT TERM RESPONSES




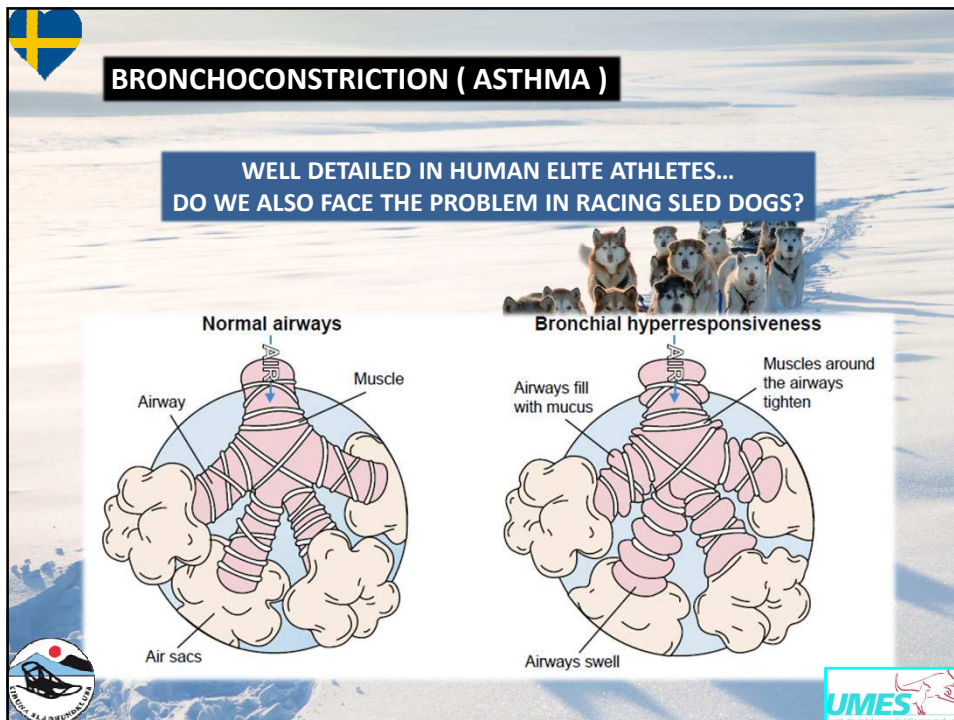
- COLD AIR HYPERPNEA
- RHINORRHEA
- CONGESTION UPPER WAYS
- COUGH

2. LONG TERM RESPONSES

- REPEATED COLD AIR HYPERPNEA
- DAMAGE OF AIRWAYS EPITHELIUM
- CHANGES IN AIRWAYS FUNCTION

3. PROVOKED REFLEX LOWER AIRWAY RESPONSES

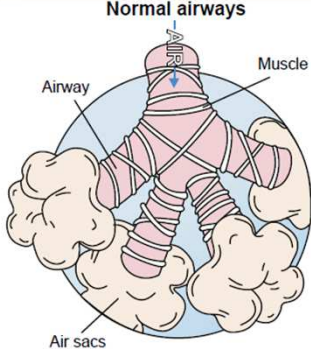
- BRONCHOCONSTRICTION

BRONCHOCONSTRICTION (ASTHMA)

**WELL DETAILED IN HUMAN ELITE ATHLETES...
DO WE ALSO FACE THE PROBLEM IN RACING SLED DOGS?**

Normal airways

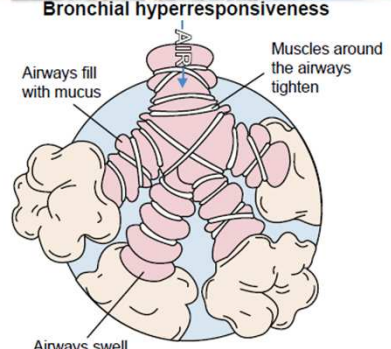


Airway

Muscle

Air sacs




Bronchial hyperresponsiveness




Airways fill with mucus

Muscles around the airways tighten

Airways swell









EXERCISE INDUCED BRONCHOCONSTRICTION (EIB)

- Multifactorial, not completely understood
- **Dry air breathing** results in the release of mediators (hist)
- **Large volume of colder air exchange**, overwhelming upper airway ability to warm the air effectively
- **Airway narrowing**
- Inflammation in the airways
- Decrease of inflammatory cells after high-level exercise

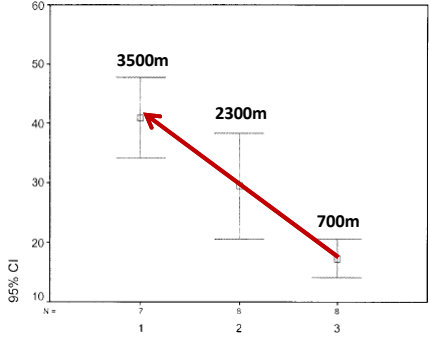
IN HUMANS, PREVALENCE AROUND 10p100

WHAT ABOUT ALTITUDE ?


Pulmonary Hypertension Induced in Dogs by Hypoxia at Different High-Altitude Levels
 T.M. Glauss^{1*}, M. Hässig², C. Baumgartner¹ and C.E. Reusch²
¹Division of Cardiology, ²Department for Small Animals, and ³Division of Herd Health, Department of Large Animals, University of Zurich, Winterthurerstr. 260, CH-8057 Zurich, Switzerland

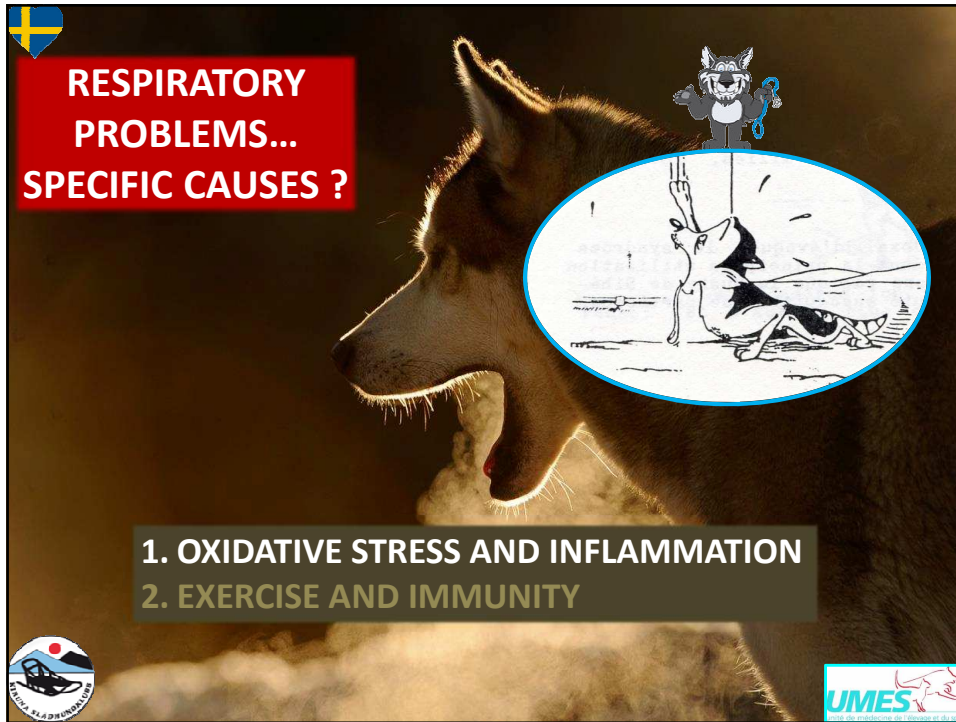
Parameter	3500 m	2300 m	p	Control dogs	Normal reference range
PCV %	48 (4)	49 (4)	0.48	48 (6)	43-56
PH	7.42 (0.03)	7.37 (0.04)	0.0008	7.40 (0.03)	7.35-7.46
PO ₂ (mmHg)	52.1 (5.1)*	61.9 (7.4)*	0.001	87.9 (6.9)	90-110
SO ₂ (%)	87.7 (2.4)*	90.7 (3.7)*	0.021	96.7 (0.8)	90-100
PCO ₂ (mmHg)	24.1 (1.6)*	24.0 (3.1)*	0.95	28.1 (2.6)	26-42
HCO ₃ (mmHg)	12.8 (10.5)*	13.7 (1.4)*	0.70	17.4 (1.9)	18-24
BE (mmol/L)	-8.3 (1.8)	-11.6 (1.4)*	0.0001	-7.7 (2.6)	-3 to +1



SYSTOLIC PULMONARY ARTERIA PRESSURE (mmHg)

(GLAUSS 2003)

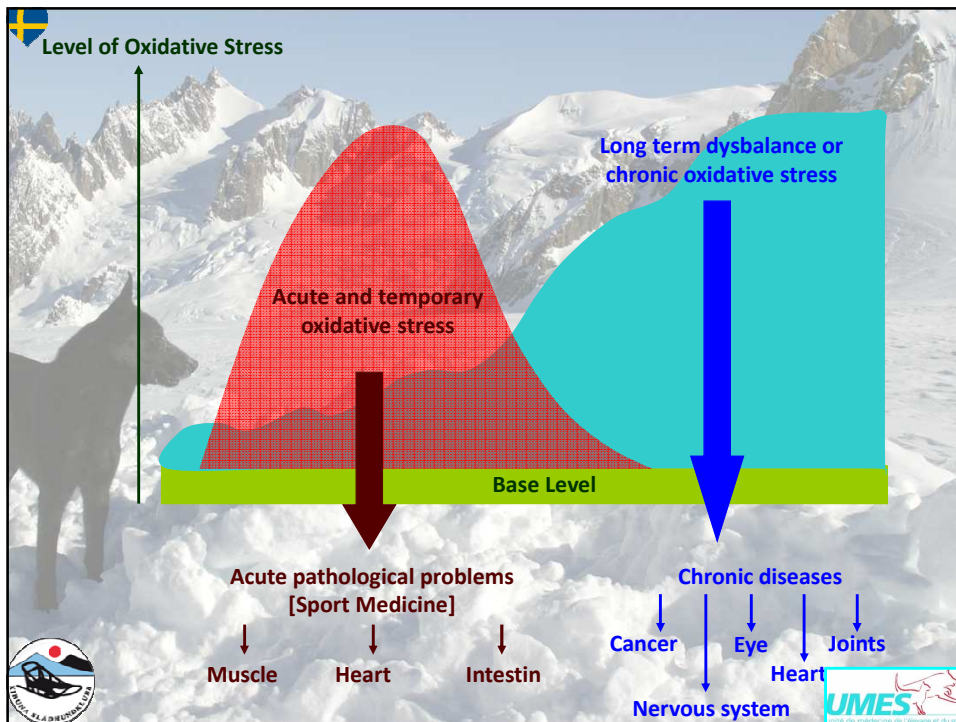




RESPIRATORY PROBLEMS... SPECIFIC CAUSES ?

1. OXIDATIVE STRESS AND INFLAMMATION
2. EXERCISE AND IMMUNITY

Logos: Swedish flag, Umeå University (UMES), and a circular logo with a dog and a mountain.






WHAT IF ROS - FREE RADICALS – WERE USEFULL ?

Many recent observations are opposing the traditional concept on ROS, **suggesting the protective role of ROS in immune-mediated inflammatory diseases.**









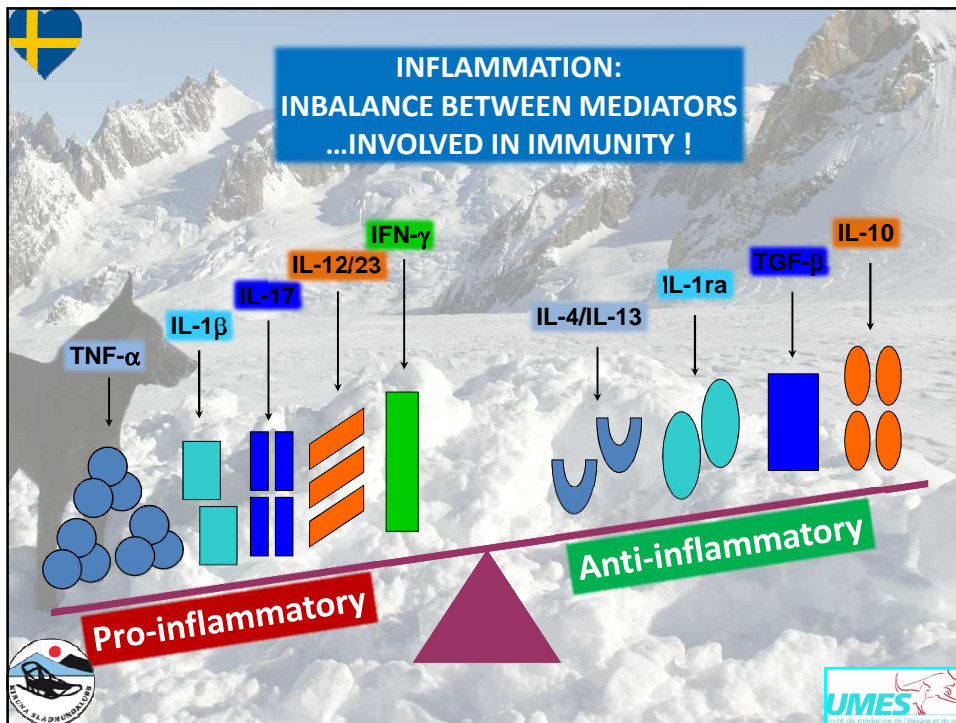



TOO MUCH ANTIOXIDANTS IS HARMFULL AND ACTS AS A PROINFLAMMATORY FACTOR

The **use of antioxidants must be calibrated** with careful consideration of the **balance between protective and suppressive effects according to the needs** by observing appropriate lab values for ROS and oxidative damage, outcomes for regulation of inflammation, and the dog's subjective impression of energy versus fatigue.

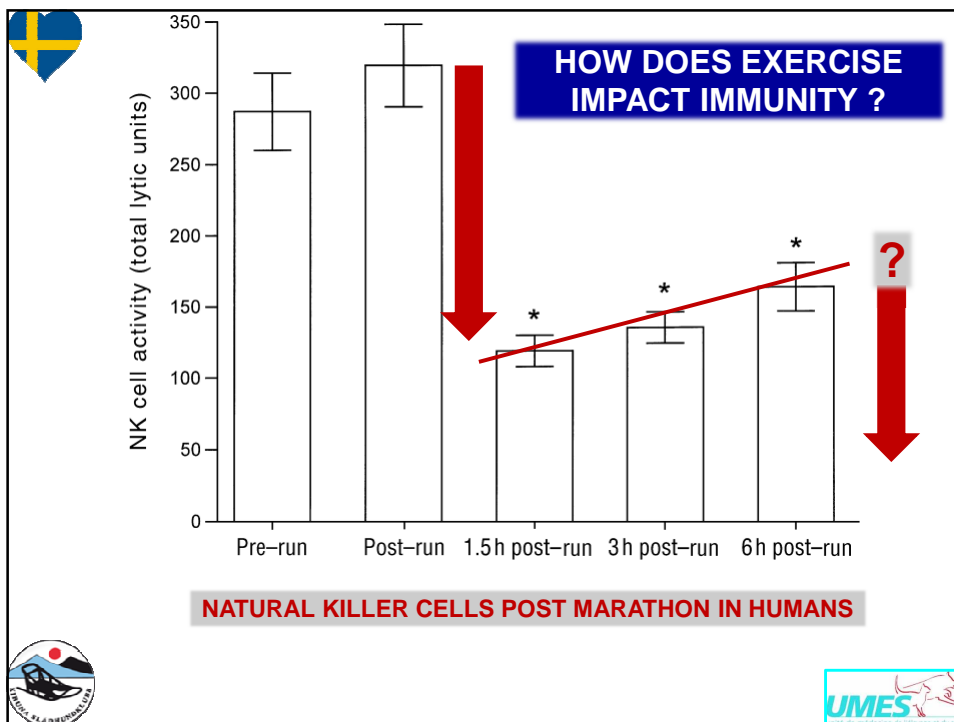
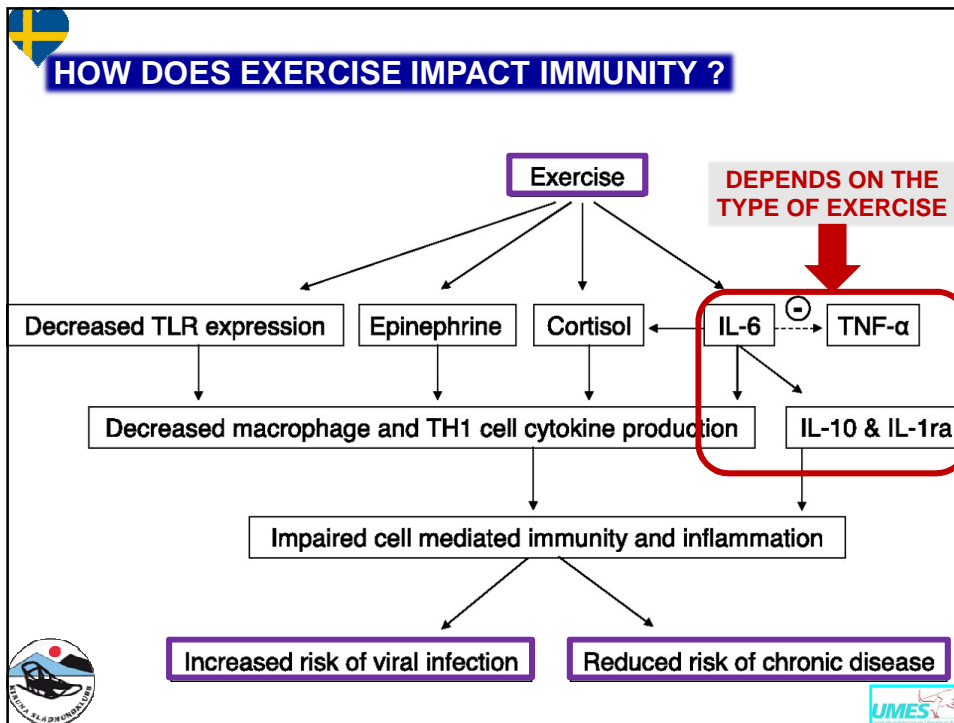
ROS Level	ROS Zone	Clinical Observation	Genotype	Mechanism	Immuno-modulation
↑	Inflammatory Zone	Reperfusion Injury	GPx1 ^{-/-} ; x GPx2 ^{-/-}	Direct Tissue Damage	
	Threshold		Threshold		
↓	Anti-inflammatory Zone		GPx1 ^{-/-} PxxIII ^{-/-}	Compensation (Treg, IDO, HIF-1α)	HBO PFD
	Normal range		Normal range		
↓	Sub-optimal Inflammatory Zone	CGD	Ncf1 ^{-/-} Nox2 ^{-/-}	Counter-action of Compensation	

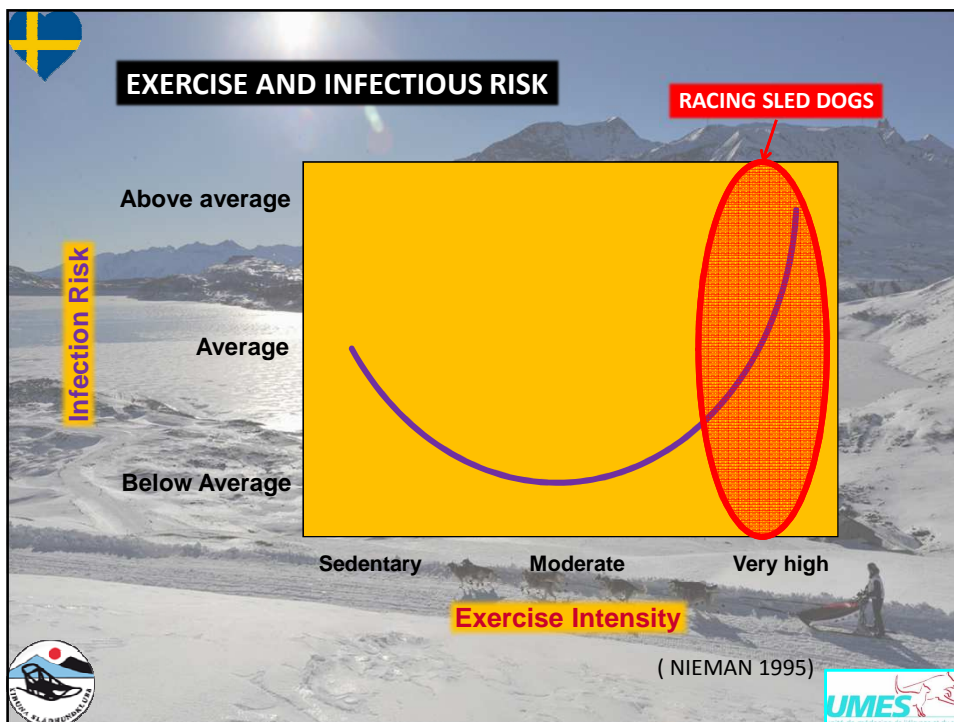
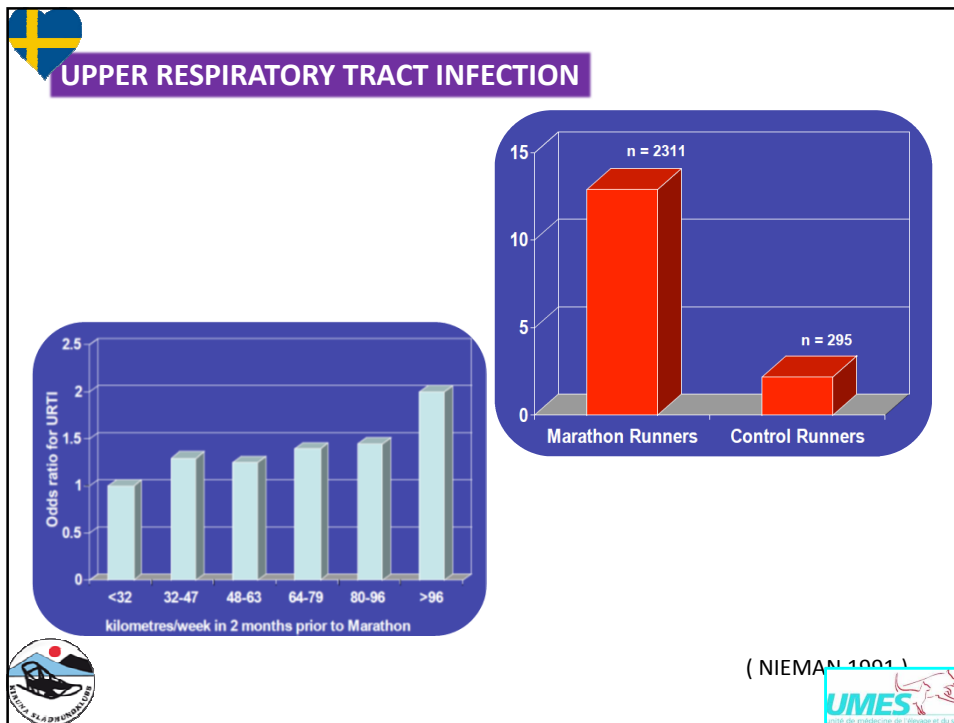



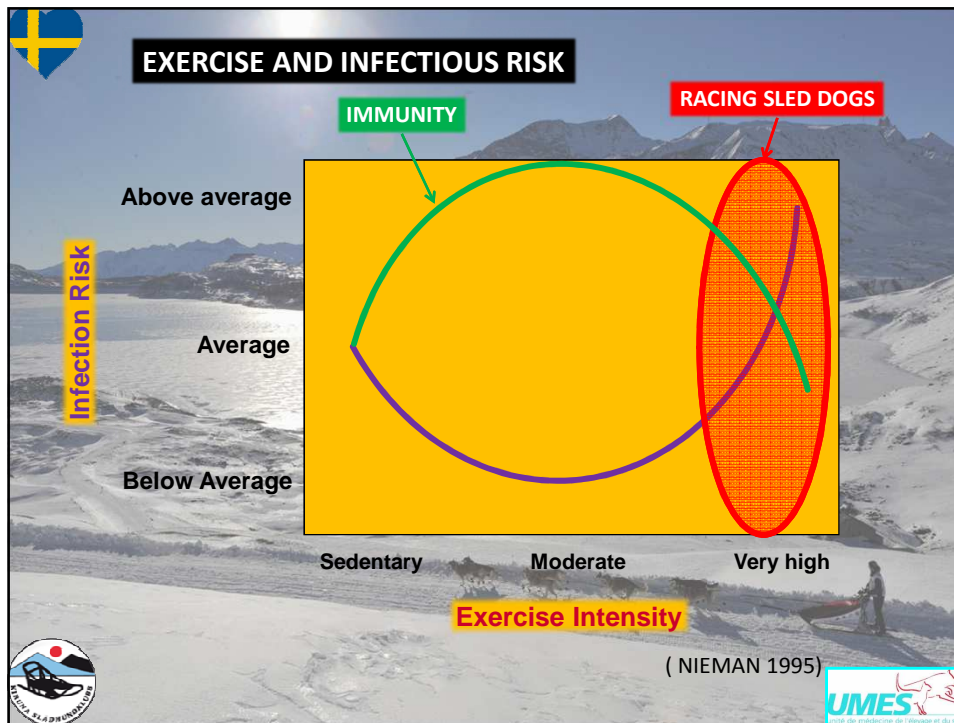


**RESPIRATORY PROBLEMS...
SPECIFIC CAUSES ?**

1. OXIDATIVE STRESS AND INFLAMMATION
2. EXERCISE AND IMMUNITY



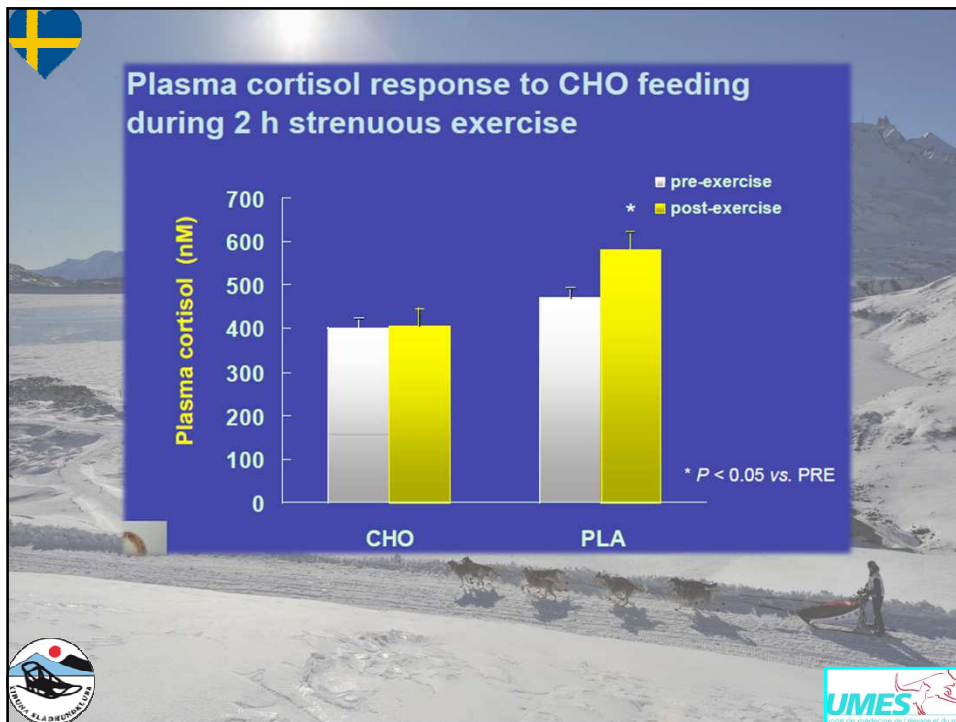
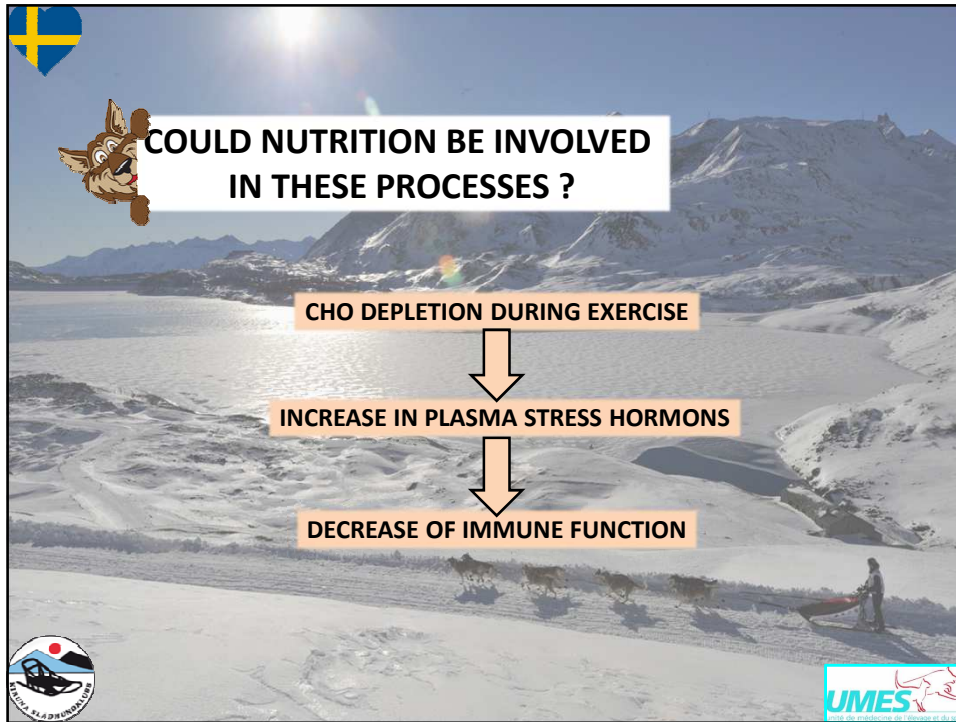


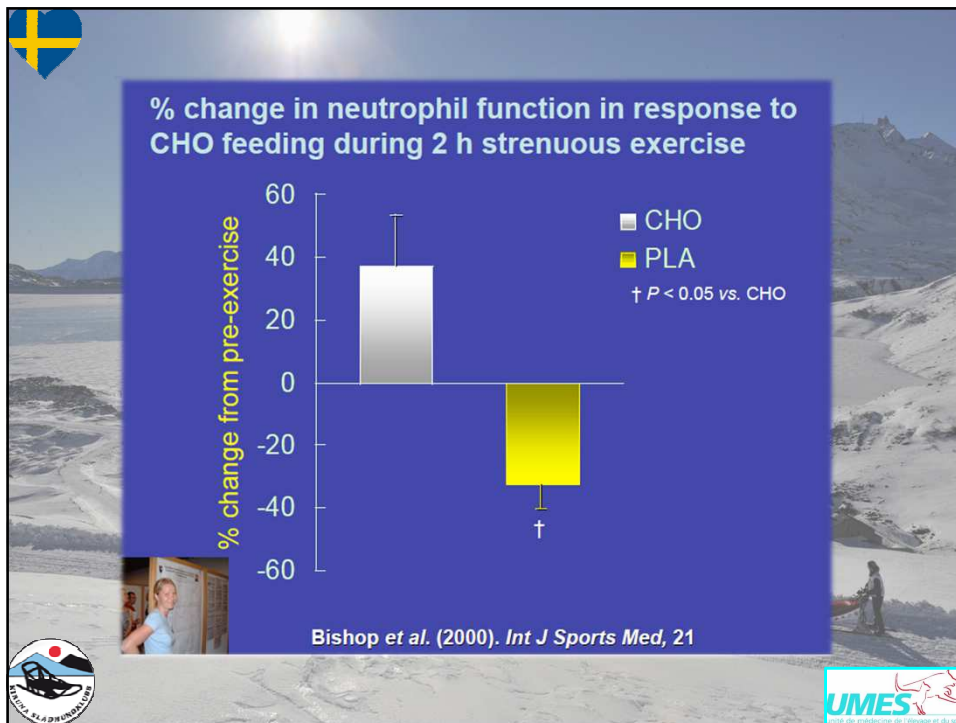


EXAMPLE OF RECOMMANDATIONS FOR HUMANS

To counter exercise-induced alterations in immunosurveillance and host protection against pathogens, the endurance athlete should consider these guidelines:

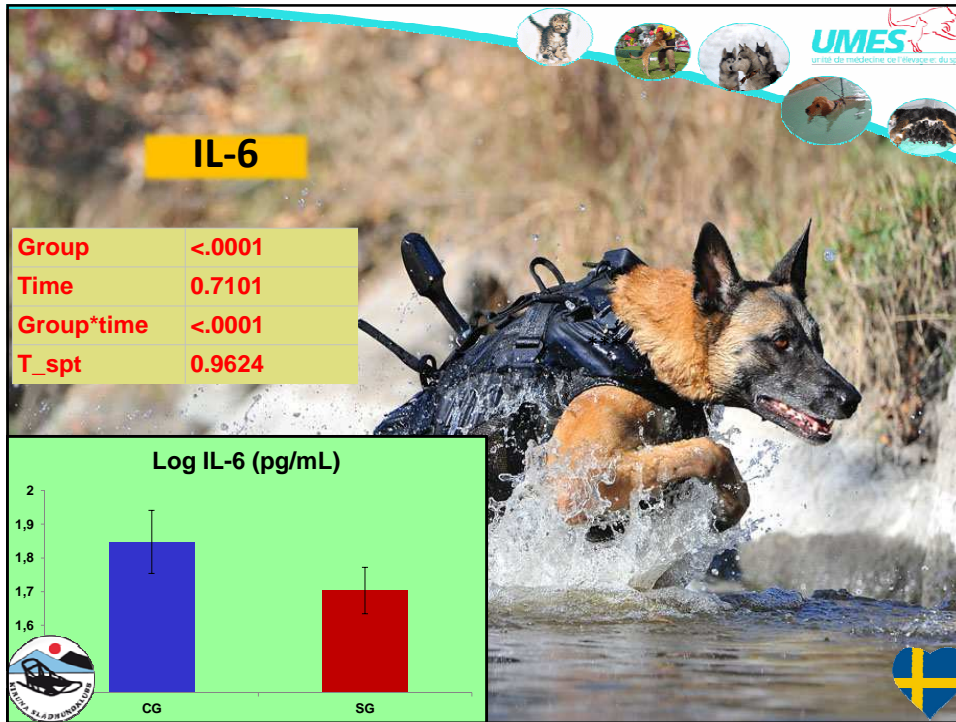
- **Keep other life stresses to a minimum** (mental stress in and of itself has been linked to increased URTI risk).
- Eat a **well-balanced diet** to keep vitamin and mineral pools in the body at optimal levels.
- Avoid overtraining and **chronic fatigue**.
- Obtain **adequate sleep on a regular schedule** (disruption is linked to suppressed immunity).
- Avoid **rapid weight loss** (linked to adverse immune changes).
- Avoid putting the hands to the eyes and nose (a major route of viral self-inoculation).
- Before important race events, avoid **sick people and large crowds** when possible.
- For athletes competing during the winter months, influenza vaccination is recommended.





UMES-ROYAL CANIN PROTOCOLE 2013

- Maltodextrin
- Hydrolysed proteins (BCAA riched)
- Dilution in water (300mL)







SHOULD WE...?

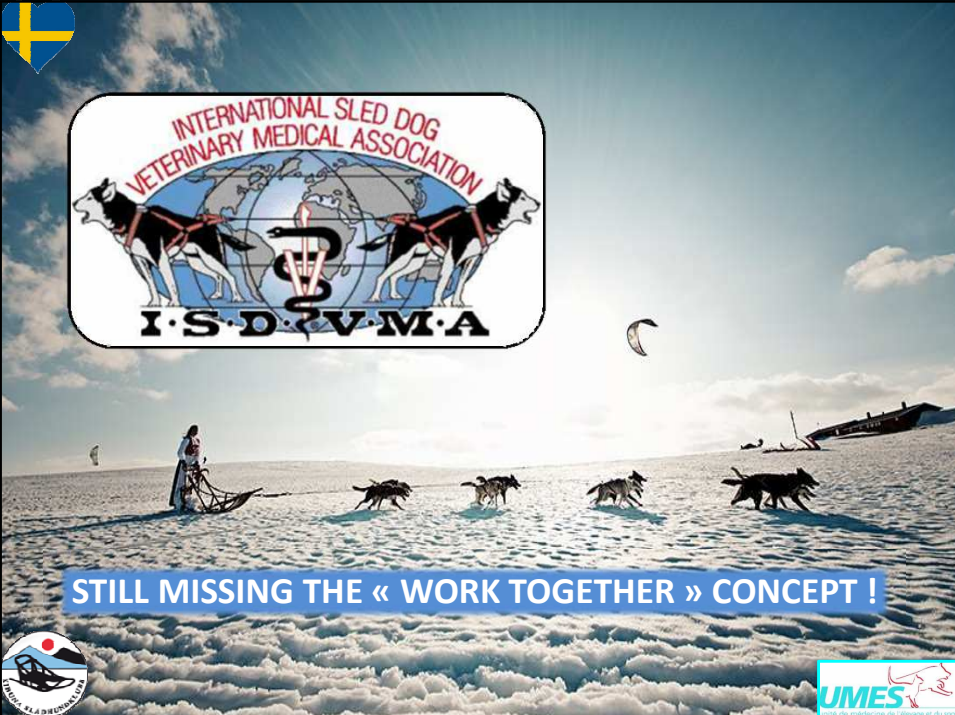
- STILL ENHANCE WORKS ON INDUCED STRESSES
- DEVELOP A RESEARCH PROGRAM ON DOG/EXERCISE/IMMUNITY
- IMPROVE OUR APPROACH ON INFLAMMATION MEDIATORS
- WORK WITH MUSHERS ON TRAINING PROGRAMS AND THEIR IMPACTS



A photograph of a sled dog team pulling a sled on a snowy street in Chicago. A sign in the background reads "Welcome to Chicago". The scene is hazy, suggesting a winter day in the city.





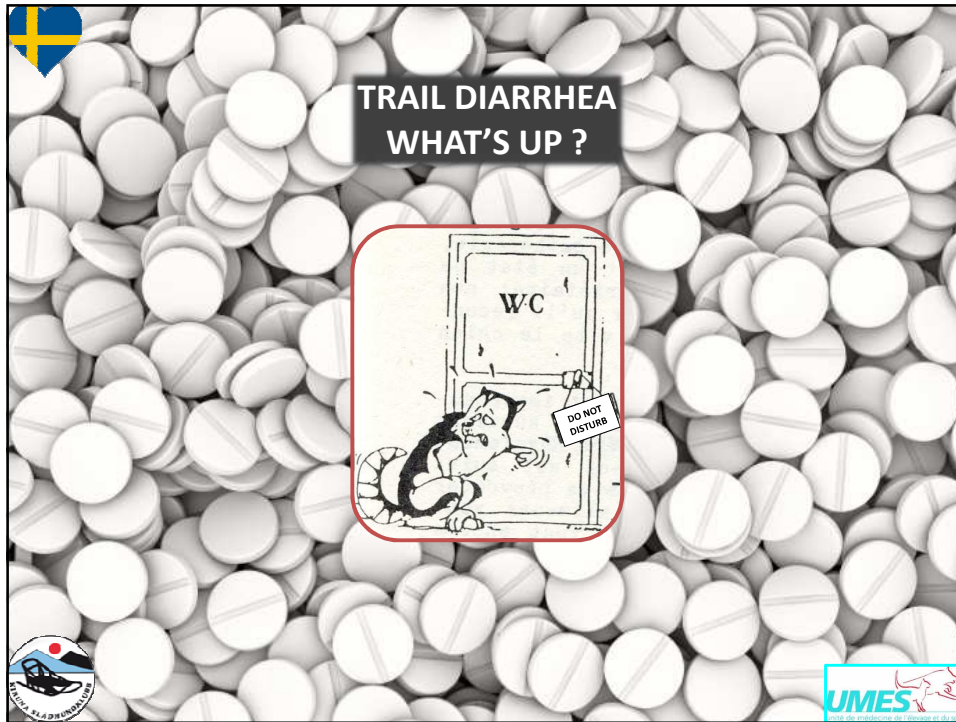
**INTERNATIONAL SLED DOG
VETERINARY MEDICAL ASSOCIATION**
I · S · D · V · M · A




A photograph of a sled dog team pulling a sled on a snowy beach. The sky is blue with a few clouds, and a kite is visible in the air. A boat is partially visible in the background.

STILL MISSING THE « WORK TOGETHER » CONCEPT !








SLED DOG ACTION COALITION

Committed to improving the lives of Iditarod sled dogs and providing truthful information about their treatment




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@SledDogAction

HOME
IDITAROD FACTS
THE HARSH REALITY
LATEST NEWS
MUSHERS & VETERINARIANS
HELP THE DOGS
SUCCESSSES
LINKS


Dog injuries, sicknesses and extreme stress

Click on the links or arrows below to view expanded content.



- ▼ Sick, injured, tired Iditarod dogs don't want to run
- ▼ Iditarod dogs have lung damage
- ▼ Statistics tell sad stories
- ▼ Iditarod dogs have kennel cough
- ▼ Airborne fecal material makes dogs sick
- ▼ Dogs foam from profuse sweat in freezing weather
- ▼ Dogs have trouble sleeping in



Sled dogs are often stricken with intense bloody diarrhea during the Iditarod



Sick, injured and tired dropped dogs are crammed into a small airplane. The dogs are not properly secured and can be injured by turbulence, to which a small plane is especially vulnerable.



QUICK LINKS

- Iditarod Dog Deaths
- Dog Injuries in Iditarod
- Poor Veterinary Care
- Cruel Dog Training
- Dog Kennel Horrors
- Iditarod History
- Articles & Interviews About the Iditarod
- Musers Abuse Dogs During Iditarod

Dog Deaths and Near-Death Incidents

At least 143 dogs have been run to death or have died from other causes in the Iditarod. There is no official count of dog deaths available.

Sign Up for SDAC Alerts





DIGESTIVE TRACT: THE LARGEST SURFACE OF CONTACT BETWEEN ORGANISM AND OUTSIDE ENVIRONMENT


STRUCTURAL PROTECTION



DYNAMIC PROTECTION



IMMUNE PROTECTION






**TRAIL DIARRHEA
WHAT'S UP ?**


1. WHAT ABOUT READING IN THE FECES ?

2. INFECTIOUS DIARRHEA ? SOMETIMES !

3. EFFICIENT PREVENTIVE TOOLS



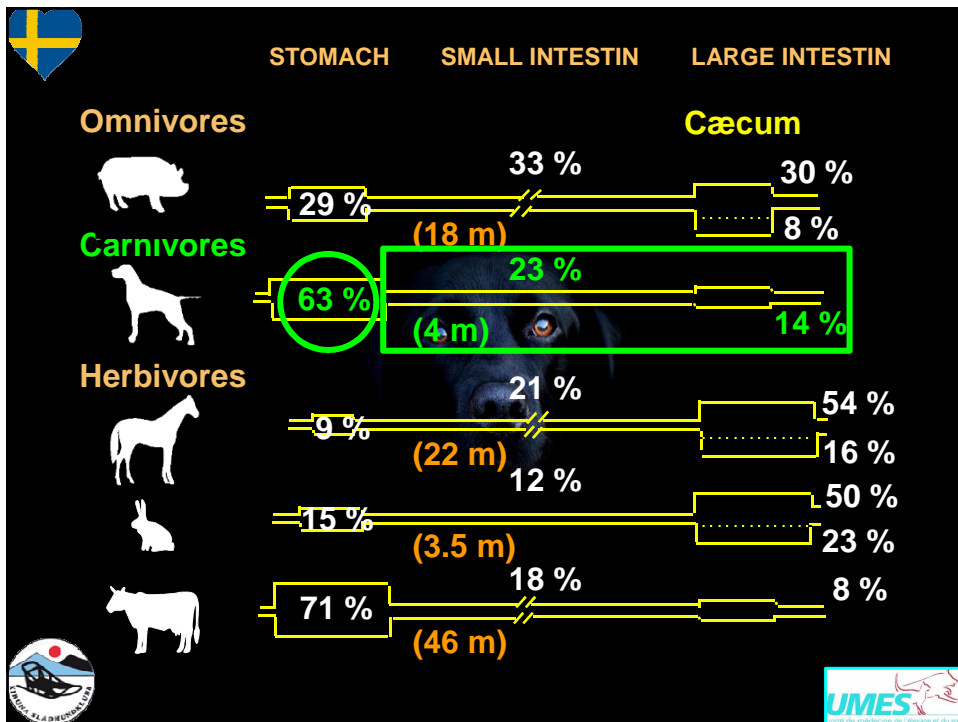
4. TREATMENT: WHO SAID ANTIBIOTICS ?

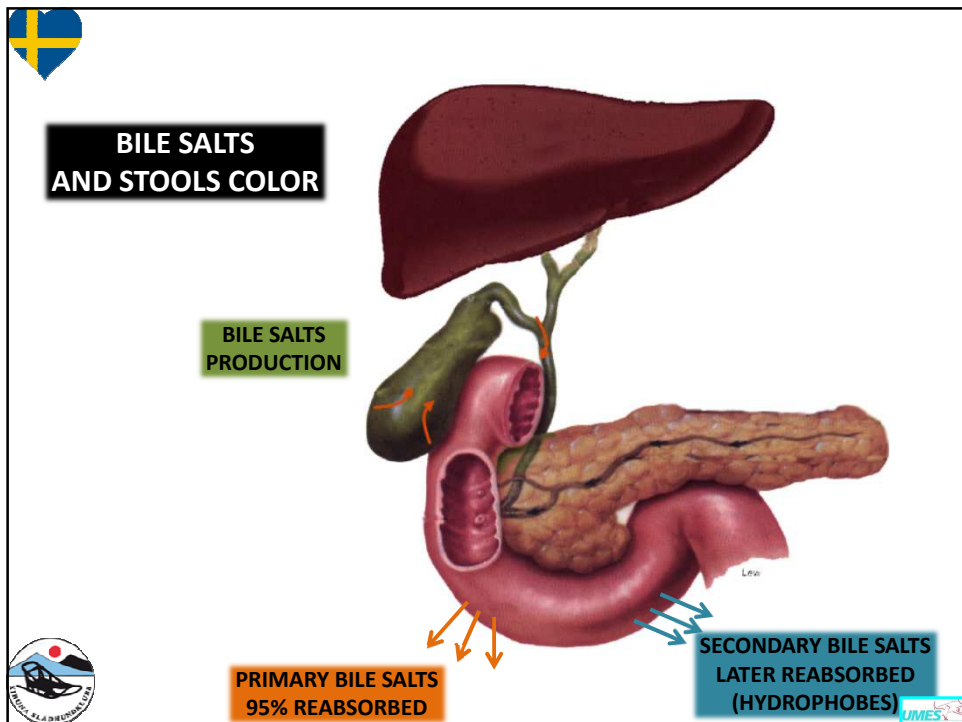


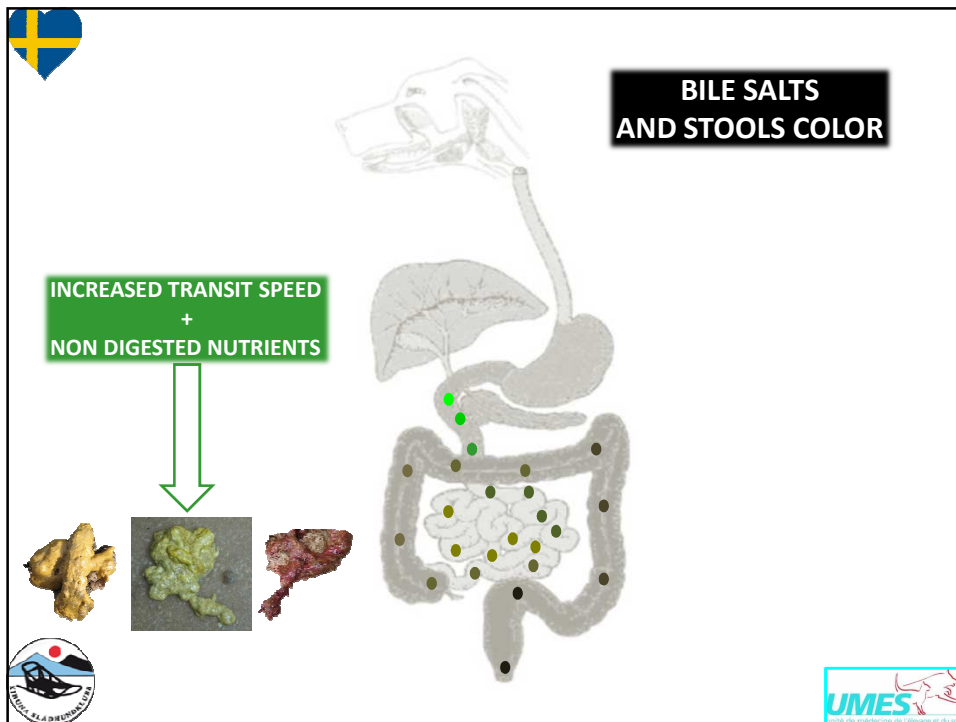
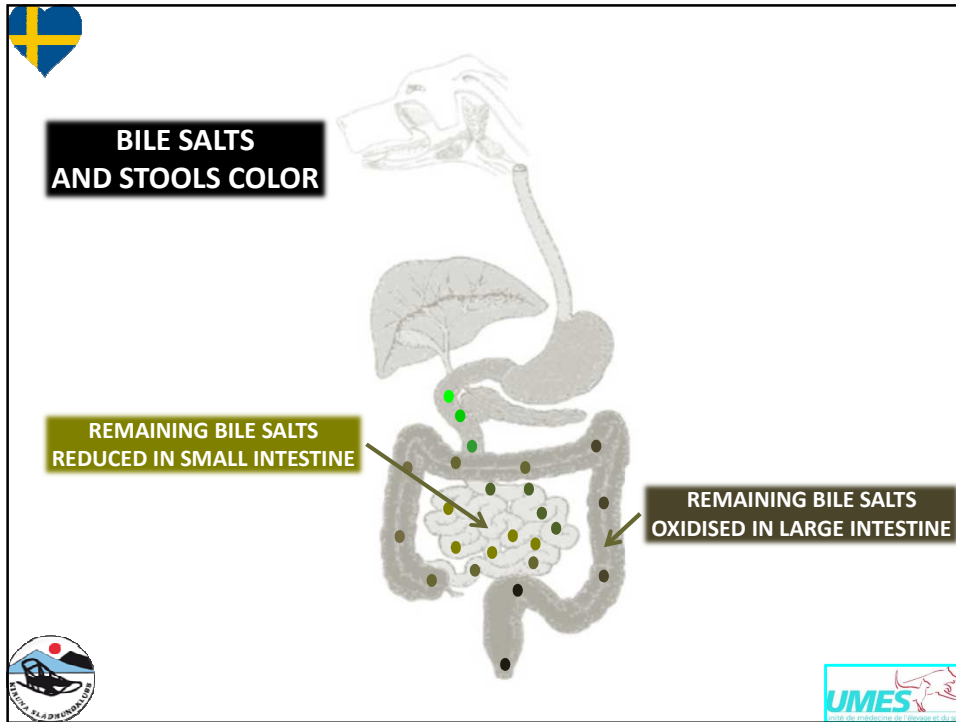


TRAIL DIARRHEA WHAT'S UP ?

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TRAIL DIARRHEA: STEP ONE

SOFTY **FOOD PARTLY UNDIGESTED**



TRAIL DIARRHEA: STEP TWO

SOFTY **URNS GREENISH**



TRAIL DIARRHEA: STEP THREE

SOFTY **URNS LIGHT GREENISH**

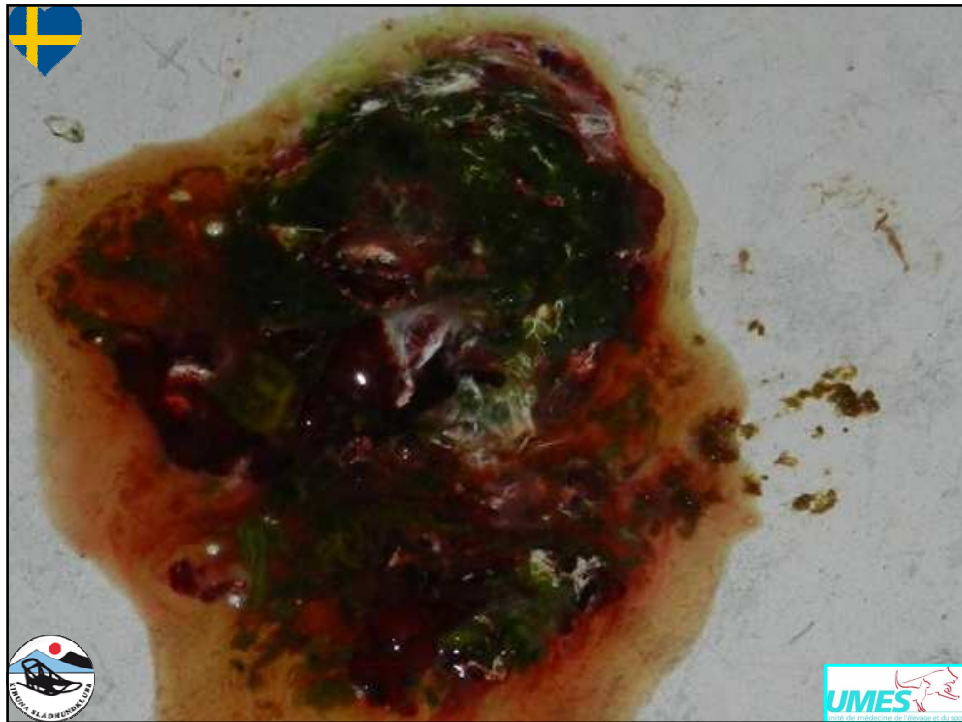
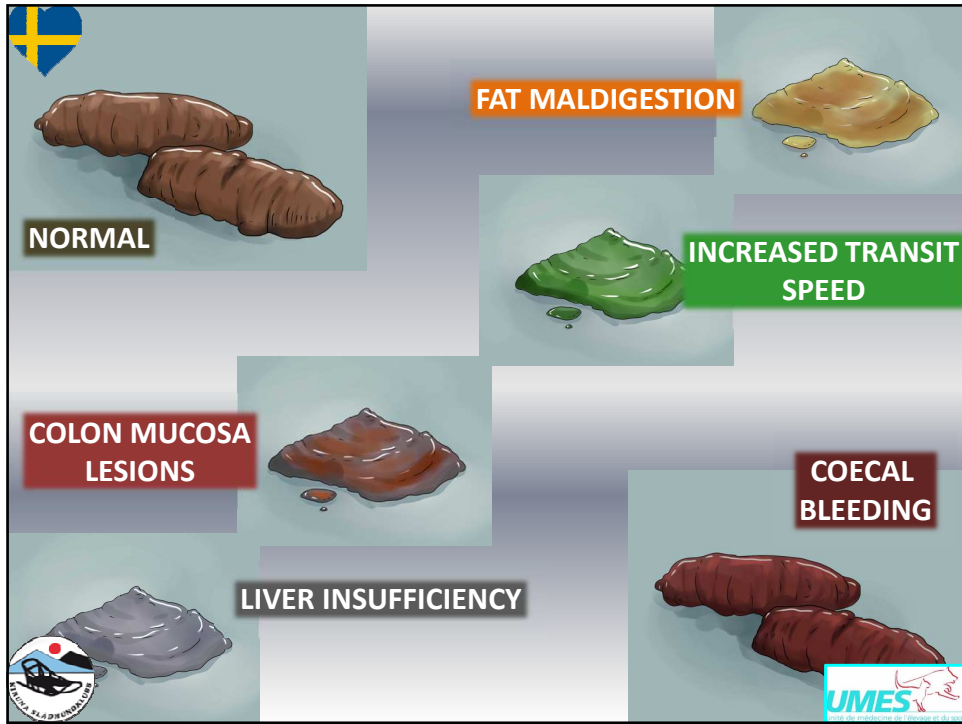


TRAIL DIARRHEA: RARELY









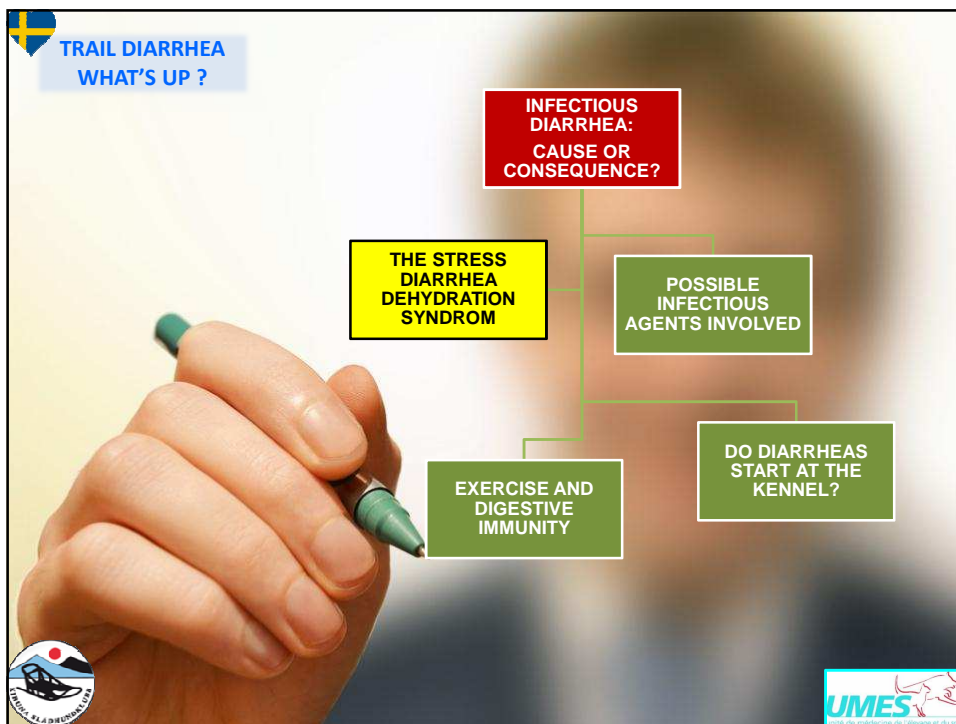
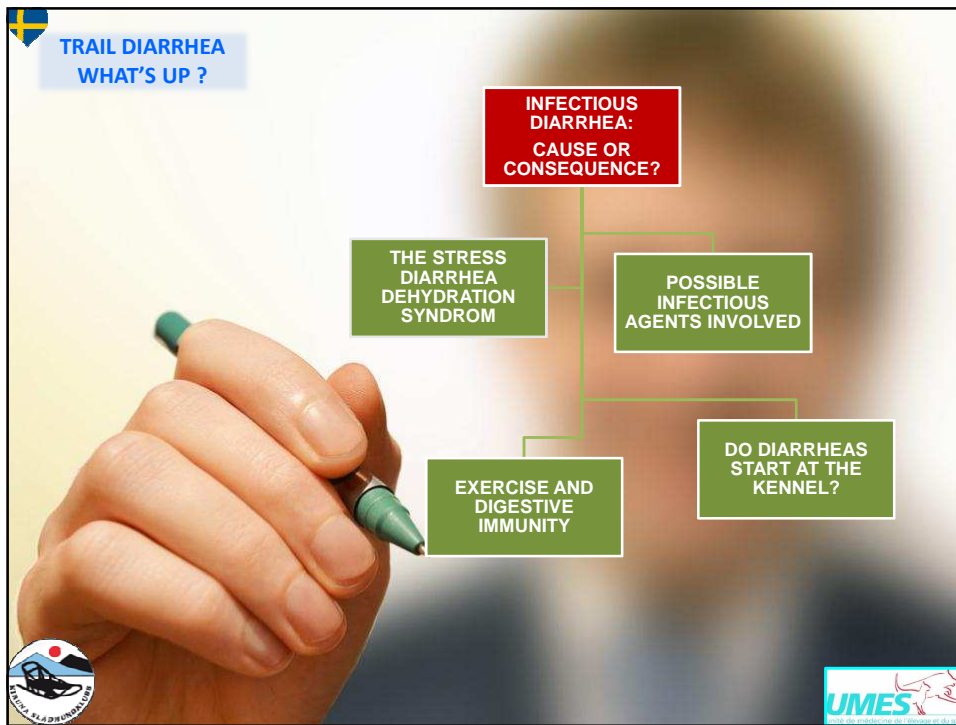
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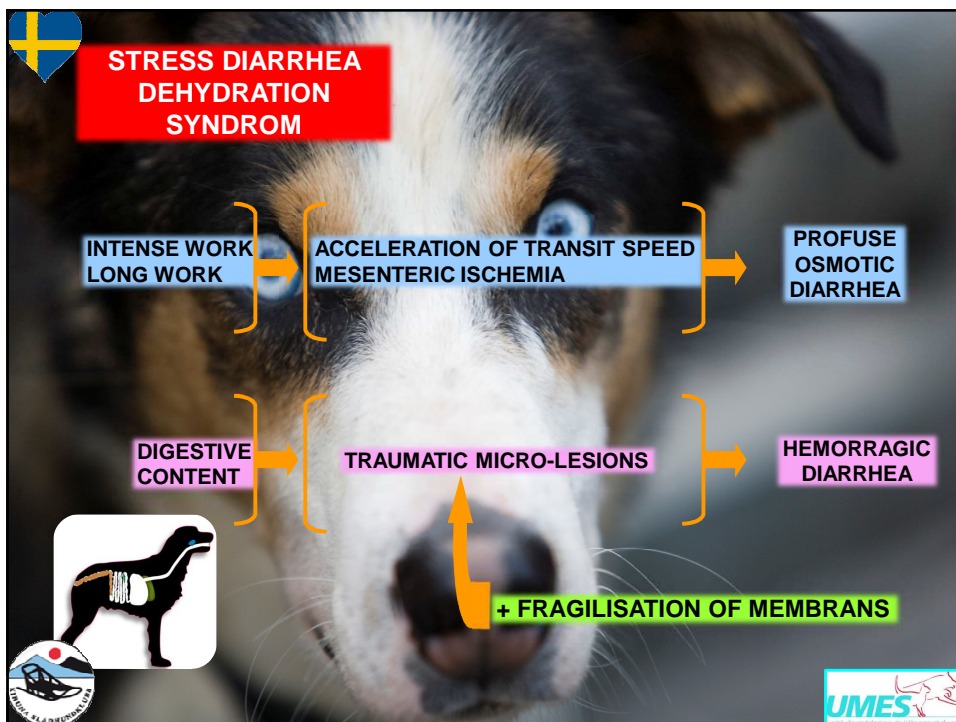
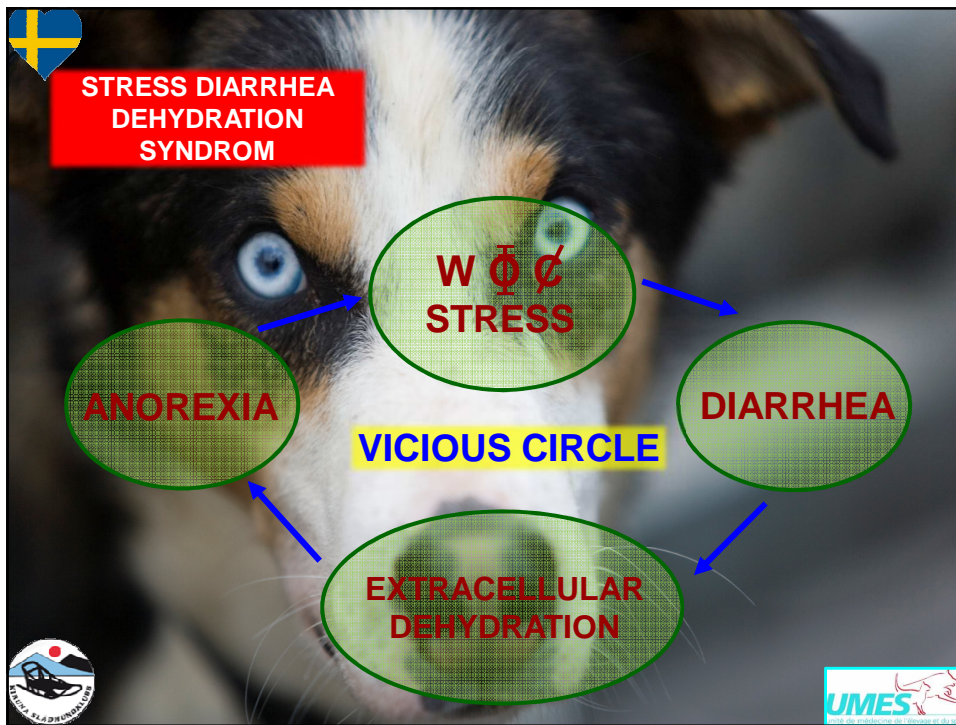
STRESS DIARRHEA DEHYDRATION SYNDROM

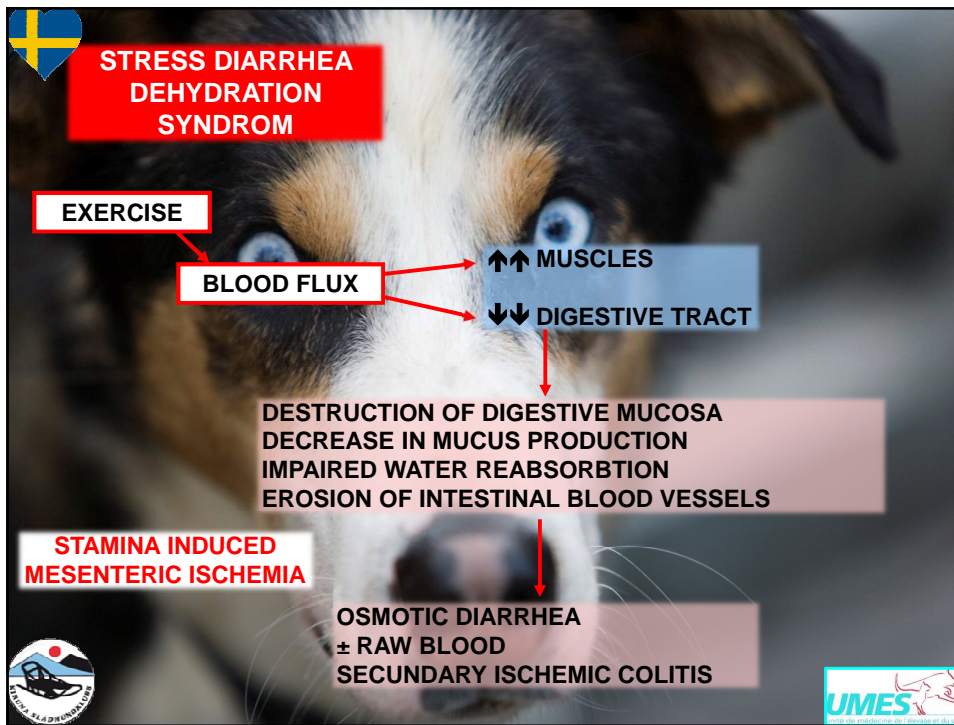
- Stool frequency, volume, consistency, color highly variable
- Extracellular dehydration (electrolytes losses)
- Cachexia (nutrient losses)
- Anorexia
- ± vomiting, ± hyperthermia
- ± tenesmus
- ± melana and/or hematochezia



Umeå University

UMES







 **STRESS DIARRHEA
DEHYDRATION
SYNDROM**

→ **“RUNNER’S TROT”** **OTHER INVOLVED
FACTORS**

- SPASMODIC CONTRACTIONS OF DIGESTIVE MUCOSA
- PAIN, TENESMUS, HEMORRAGIC DIARRHEA

→ **INDUCED EXTRACELLULAR DEHYDRATION**

→ **“CAECAL SLAP SYNDROM”**

- MUCOSA MICROTRAUMAS
- EXCESS OF IRON SALTS IN A MINERAL FORM

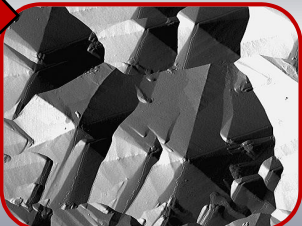
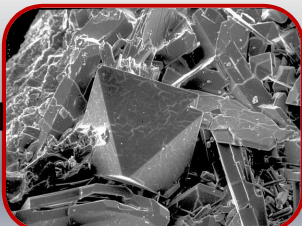
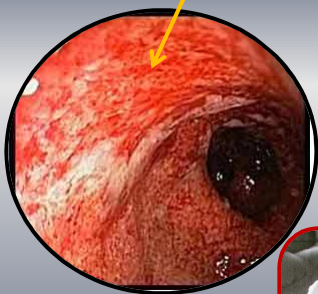


 **BLOODY DIARRHEA
ANOTHER KIND OF PROBLEM**



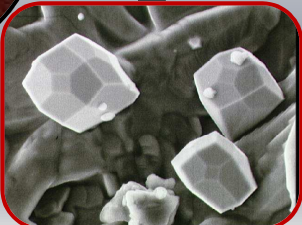


CAECAL SLAP SYNDROM

NUMEROUS HEMORRAGIC MICROLESIONS

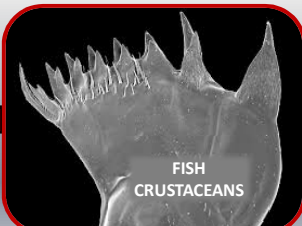
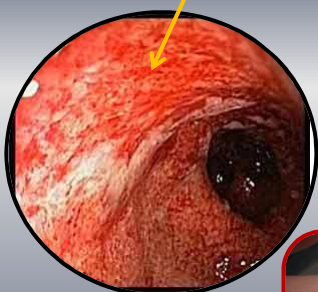


TRACE ELEMENTS IN A MINERAL SALT FORM

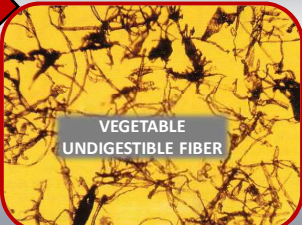


CAECAL SLAP SYNDROM


NUMEROUS HEMORRAGIC MICROLESIONS



FISH CRUSTACEANS





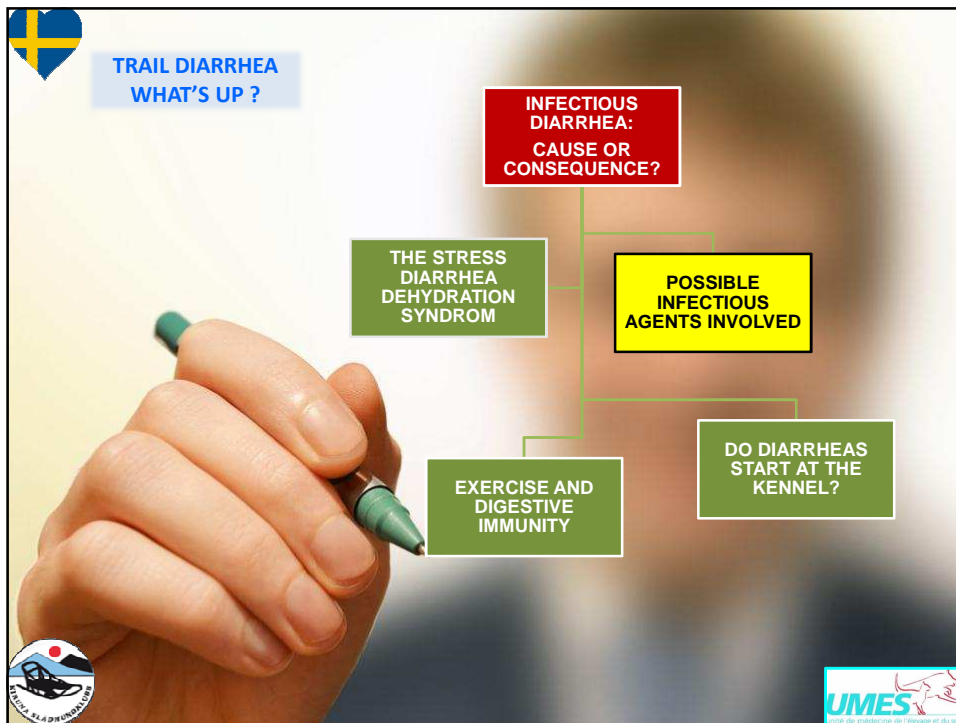
VEGETABLE UNDIGESTIBLE FIBER



BONES OR TENDONS FRAGMENTS

NON DIGESTED « FIBERS » (Veg, Ani)





MACKENZIE STUDY, IDITAROD 2010

36 p100 DOGS HAVE DIARRHEA

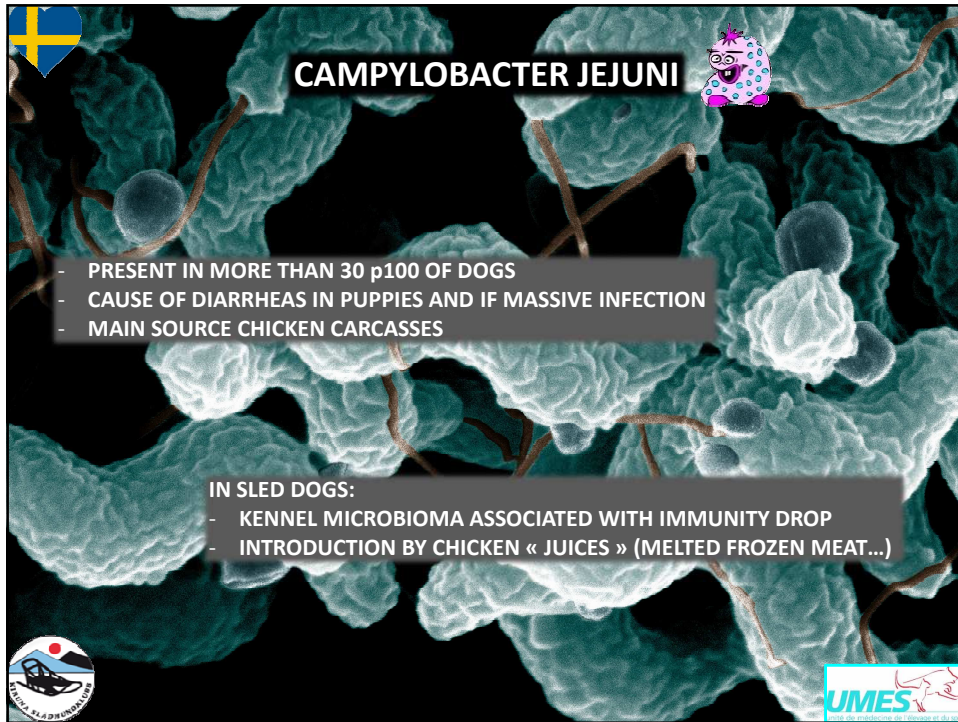
**HEMATOCHEZIA
FECAL MUCUS
MELENA** } **57.5 p100**

**SALMONELLA IN 78.2 p100 OF DOGS PRIOR TO RACE
71.3 p100 OF DOGS AFTER RACE**

**C.PERFRINGENS IN 100 p100 OF DOGS PRIOR TO RACE
95 p100 OF DOGS AFTER RACE**

**C.DIFFICILE IN 58 p100 OF DOGS PRIOR TO RACE
36 p100 OF DOGS AFTER RACE**

**CONCLUSION: « SLED DOGS PARTICIPATING IN LONG DISTANCE RACING
HAVE A HIGH PREVALENCE OF DIARRHEA AND HEMATOCHIEZIA THAT IS
NOT ASSOCIATED WITH COMMON ENTEROPATHOGENS. THE EFFECTS
OF PROLONGED EXERCISE ON THE GI TRACT ARE INVOLVED.**

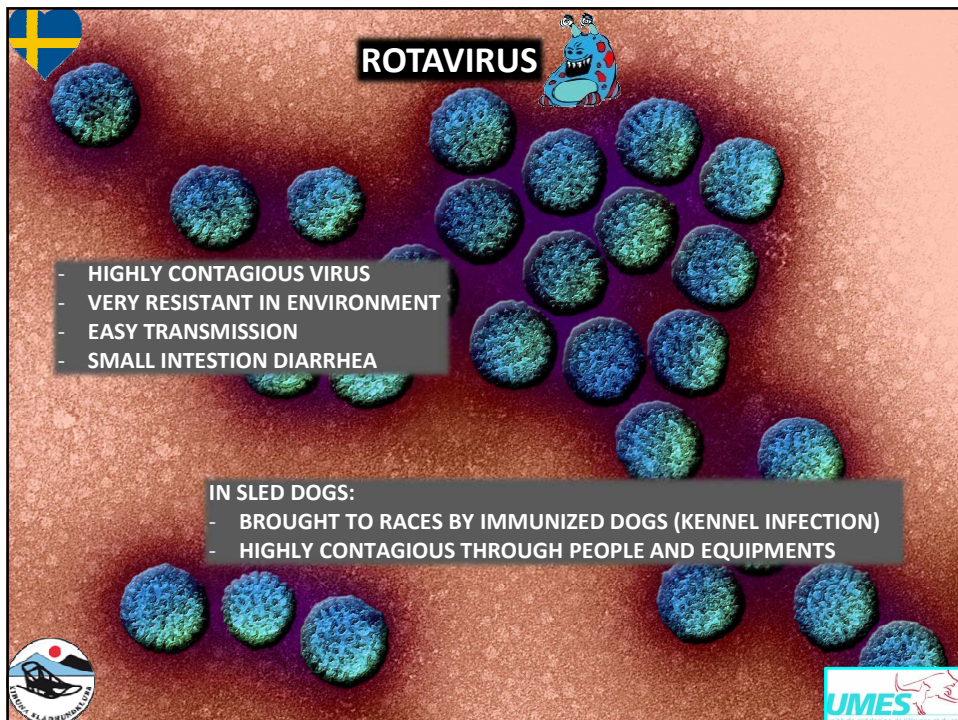






CAMPYLOBACTER JEJUNI

- PRESENT IN MORE THAN 30 p100 OF DOGS
- CAUSE OF DIARRHEAS IN PUPPIES AND IF MASSIVE INFECTION
- MAIN SOURCE CHICKEN CARCASSES

IN SLED DOGS:

- KENNEL MICROBIOMA ASSOCIATED WITH IMMUNITY DROP
- INTRODUCTION BY CHICKEN « JUICES » (MELTED FROZEN MEAT...)







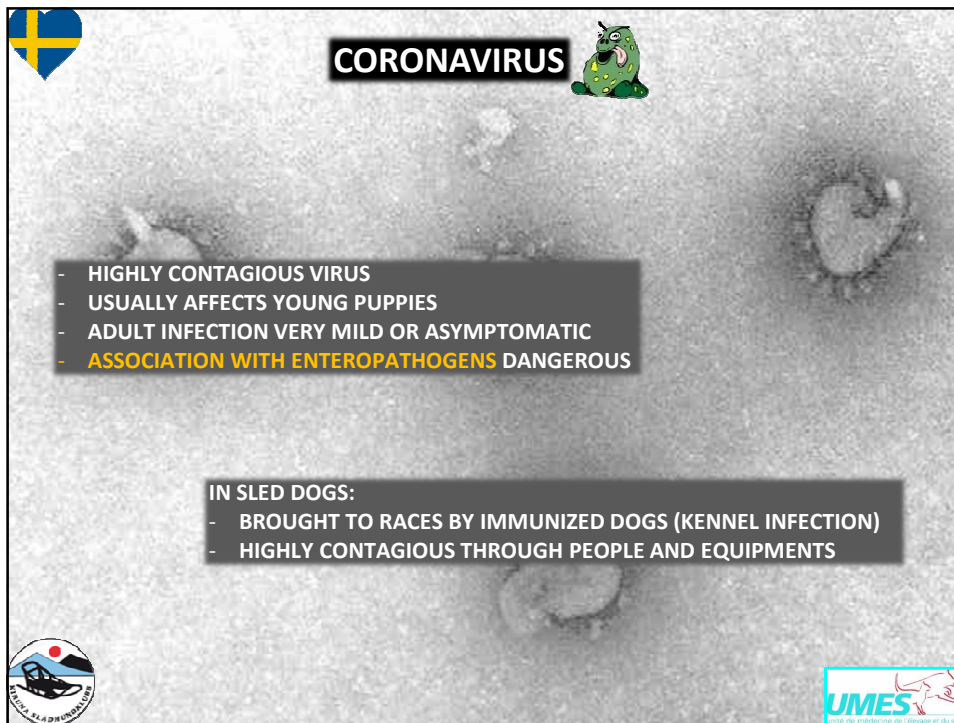
ROTAVIRUS



- HIGHLY CONTAGIOUS VIRUS
- VERY RESISTANT IN ENVIRONMENT
- EASY TRANSMISSION
- SMALL INTESTION DIARRHEA

IN SLED DOGS:

- BROUGHT TO RACES BY IMMUNIZED DOGS (KENNEL INFECTION)
- HIGHLY CONTAGIOUS THROUGH PEOPLE AND EQUIPMENTS



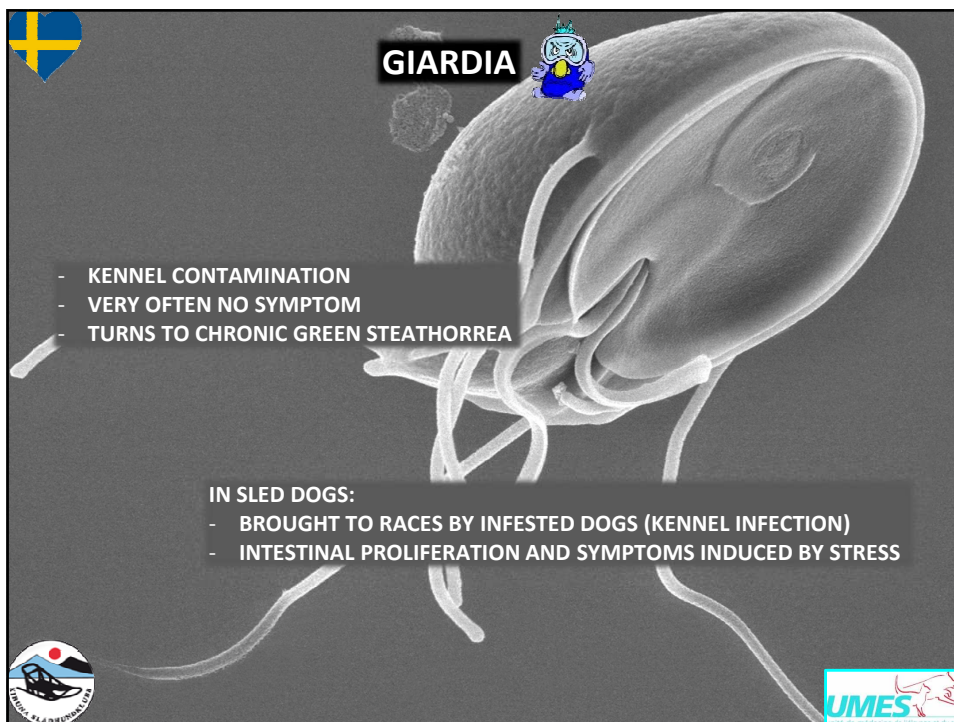






 **CORONAVIRUS** 

- HIGHLY CONTAGIOUS VIRUS
- USUALLY AFFECTS YOUNG PUPPIES
- ADULT INFECTION VERY MILD OR ASYMPTOMATIC
- **ASSOCIATION WITH ENTEROPATHOGENS DANGEROUS**

IN SLED DOGS:

- BROUGHT TO RACES BY IMMUNIZED DOGS (KENNEL INFECTION)
- HIGHLY CONTAGIOUS THROUGH PEOPLE AND EQUIPMENTS





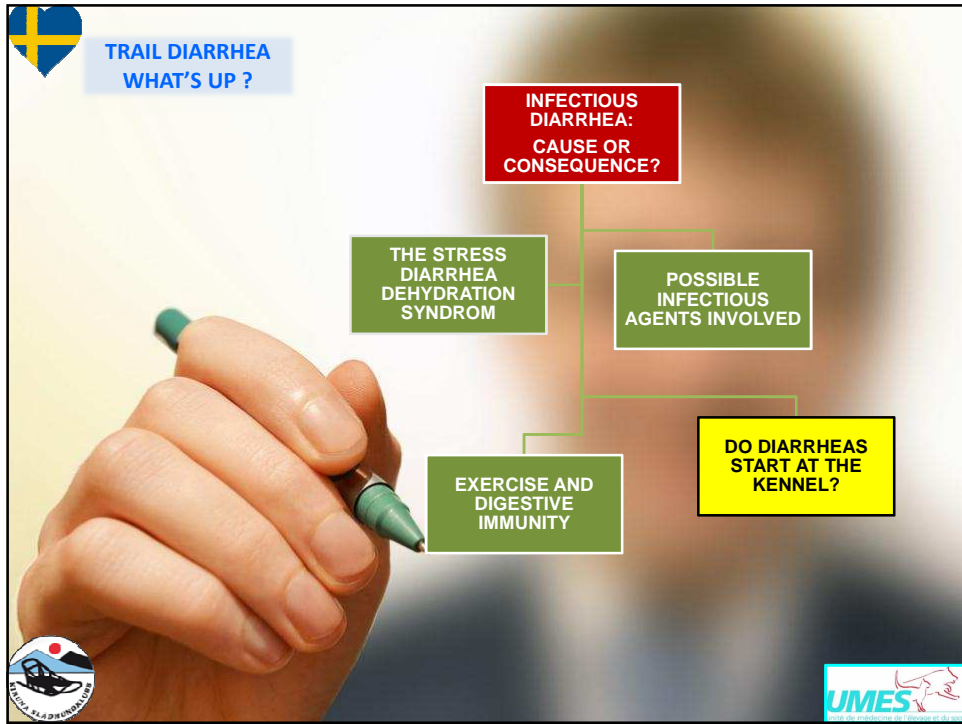
 **GIARDIA** 

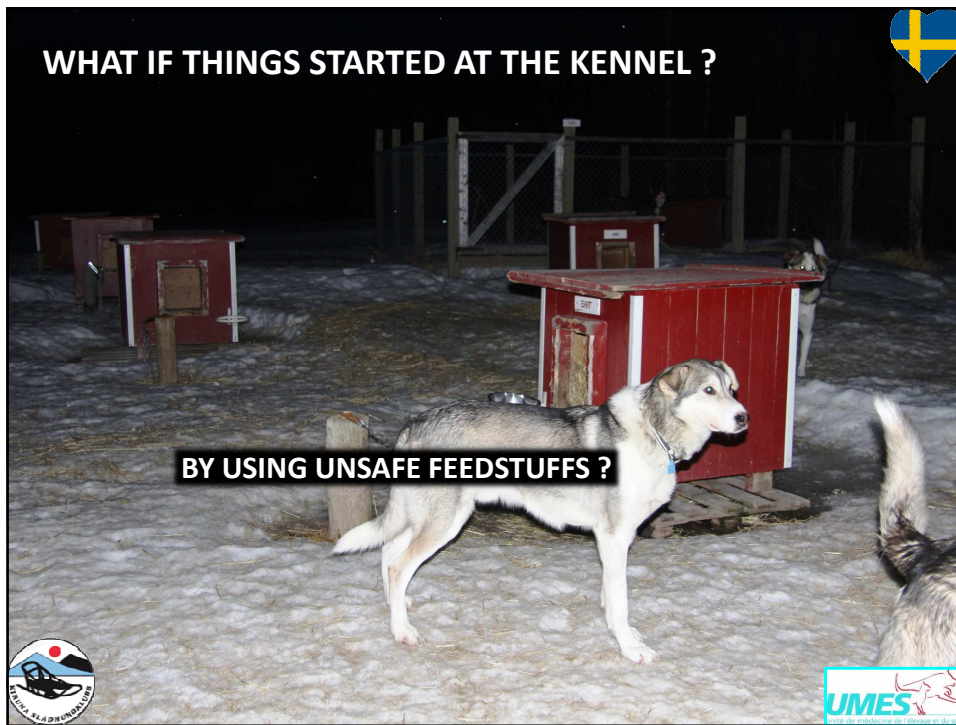
- KENNEL CONTAMINATION
- VERY OFTEN NO SYMPTOM
- TURNS TO CHRONIC GREEN STEATHORREA

IN SLED DOGS:

- BROUGHT TO RACES BY INFESTED DOGS (KENNEL INFECTION)
- INTESTINAL PROLIFERATION AND SYMPTOMS INDUCED BY STRESS







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Breaking news for everyone's consumption

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Gut Bacteria on 97 Percent of Retail Chicken Breasts
 BY JAMES ANDREWS | DECEMBER 19, 2013

It won't all harm you, but some of it might. That's the caveat in the latest Consumer Reports analysis of tests on raw chicken breasts purchased at retailers nationwide. The analysis found that 97 percent of tested chicken breast samples "harbored bacteria that could make you sick."

While it is true that the detected bacteria could cause infections if improperly handled, a smaller proportion has the potential to cause foodborne illness in the classic sense.

In their most detailed chicken sampling study to date, Consumer Reports performed contamination testing on 316 samples of raw chicken breast and issued the findings in a report entitled, "The High Cost of Cheap Chicken." The study will be featured in the February 2014 issue of Consumer Reports and online at ConsumerReports.org.

The analysis found high rates of intestinal bacteria: Enterococcus (on 80 percent of samples), E.coli (65 percent), Campylobacter (43 percent), Klebsiella (1.4 percent), Salmonella (1.1 percent) and Staphylococcus aureus (0.9 percent).

What is important to note, however, is that only some of the bacteria present at those levels would pose a food poisoning risk if ingested. For example, Enterococcus does not cause food poisoning, and all of the food poisoning maladies associated with E. coli come from a few select strains, while most are harmless to humans – and some are even beneficial.

"E. coli is ubiquitous in an animal environment, and we have it in our intestines," said Dr. Maurice Pitesky, poultry health and food safety epidemiologist at UC Davis. "We have to ask what serotypes we're dealing with."

But while Enterococcus and most E. coli may not pose a food poisoning threat, they do indicate widespread fecal contamination of chicken meat. They are also capable of causing infections of the skin, blood and urinary tract if an opportunity.


Other bacteria – Campylobacter and Salmonella – are more likely to cause diarrhea and vomiting, the classic symptoms of foodborne illness.

2014 3rd Annual FOOD MICROBIOLOGY SYMPOSIUM
 SEPTEMBER 22-24

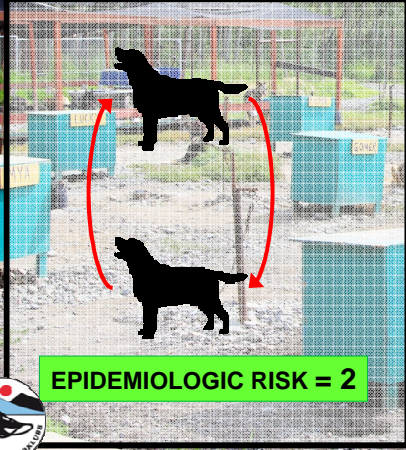
RAW CHICKEN CARCASSES USED AS A PROTEIN/FAT SOURCE AT KENNEL AND DURING RACES...???

- Poultry Juices at Store, Home
- Death Threats From Anti-GMO Nuts
- CDC: 300 People Infected With Salmonella Linked to Contact With Live Poultry
- Chinese Walmart Store Being Investigated
- Letter From the FDA

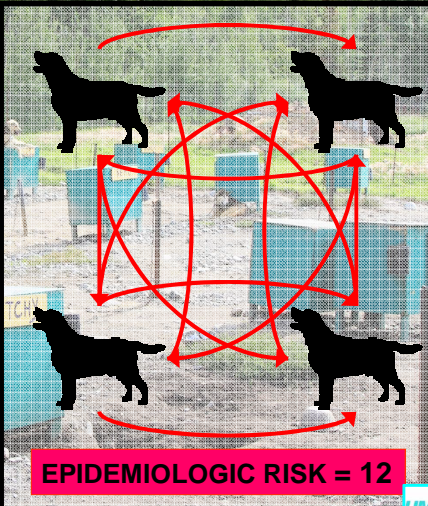






AVOID OVERPOPULATION



EPIDEMIOLOGIC RISK = 2




EPIDEMIOLOGIC RISK = 12





ADAPT SANITARY PREVENTION: BREEDING KENNEL

▶▶ The clean to dirty principle

You would never think of cleaning a room by working your way up from the floor to the ceiling. In the same way, you should never retrace your steps when cleaning kennels, because you risk spreading the very germs you wish to kill. The cleaning protocol must focus on the health risks in the various sectors, starting with the cleanest sector and ending in the dirtiest.

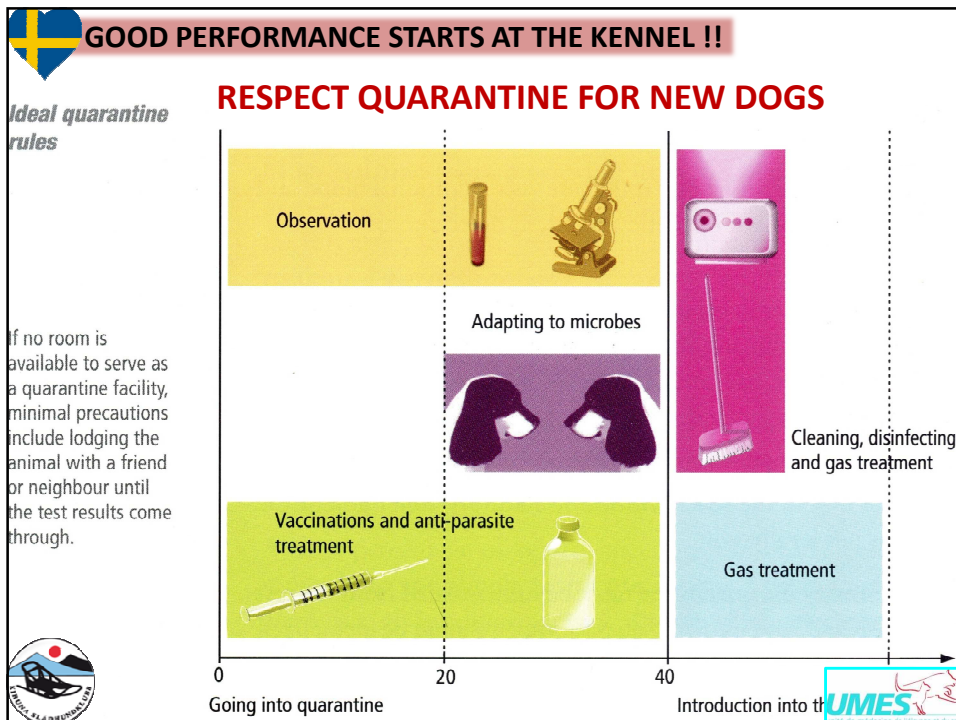


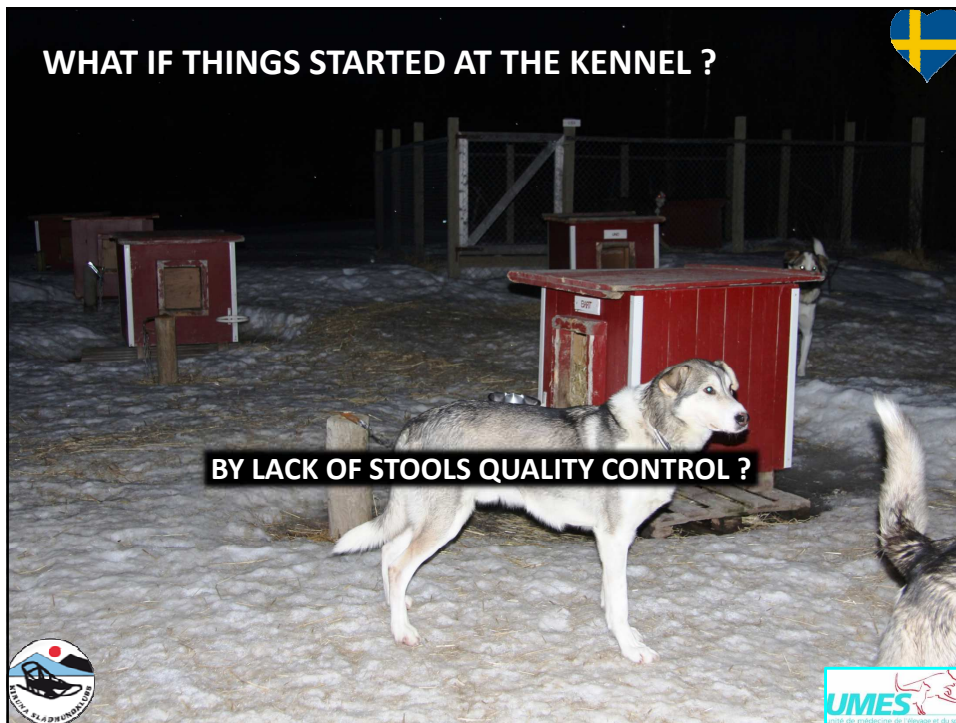






















A GOOD DOG HANDLER KEEPS AN EYE DAILY ON HIS DOG'S STOOLS

<p>Grade 1 Hard dry and crumbly; 'Bullet-like'</p> 	<p>Grade 1.5 Hard and dry</p> 	<p>Grade 2 Well formed; does not leave a mark when picked up; 'kickable'</p> 
<p>Grade 2.5 Well formed, with a slightly moist surface, which leaves a mark when picked up; almost sticky to touch</p> 	<p>Grade 3 Moist beginning to lose form, leaving a definite mark when picked up</p> 	<p>Grade 3.5 Very moist, but still has some definite form</p> 
<p>Grade 4 The majority, if not all the form is lost; poor consistency; viscous</p> 	<p>Grade 4.5 Diarrhoea, with some areas of consistency</p> 	<p>Grade 5 Watery diarrhoea</p> 



CUMULATIVE STRESS IN WORKING DOGS KENNEL



EUSTRESS	LIGHT DISTRESS	SEVERE DISTRESS
<p>BARKS ALERT NORMAL BEHAVIOUR TONIC HAPPY WITH PEOPLE RUNS NORMAL FAST RECOVERY WELL HYDRATED DRINKS WELL EATS WELL FECES NORMAL</p>	<p>GRUNTS INATTENTIVE BEHAVIOUR MISTAKES IRRITABLE AVOIDS PEOPLE RUNS POORLY SLOW RECOVERY SLIGHTLY DEHYDRATED DRINKS FEW EATS FEW LIGHT DIARRHEA</p>	<p>SILENT DOES NOT ANSWER APATHETIC DEPRESSED STAYS ALONE AVOID EXERCISE DOES NOT RUN DEHYDRATED REFUSES DRINKING REFUSES FOOD SEVERE DIARRHEA</p>
		



KENNEL STRESS SYNDROM

SAME SYMPTOMS OBSERVED ON SEVERAL DOGS

- Body weight loss (*anorexia*) or, opposite, obesity (*bulimia*)
- Pupil dilatation
- Muscle tremors
- **Frequent stools, soft with mucus on top**
- **Intermittent diarrheas**
- Dysuria
- Inhibition of reproduction behaviour
- Delayed growth
- Coprophagia
- Cannibalism
- Potomania
- Depression, hypo or hyper activity
- Automutilations
- Modifications of territorial marking behaviour
- Permanent barking


WRONG TRAINING IS A SOURCE OF PROBLEMS

OVERTRAINING

Basedow-like (symp.)

- Early fatigue
- Hyperexcitation**
- Sleep troubles
- Intermittent diarrhea**
- Anorexia
- Body weight loss
- Tachycardia
- Slight hyperthermia
- Delayed recovery
- Exercise hyperpnea
- Tremors

Addison like (parasymp.)

- Early fatigue
- Inhibition**
- Sleep normaly
- Eats normaly
- Body weight constant
- Bradycardia
- Temperature normal
- Recovery normal
- Respiration normal
- Dyscoordinaton






CUMULATIVE STRESS IS RESPONSIBLE FOR...

CELLULAR OXIDATIVE STRESS

↓

- **STRESS DIARRHEA DEHYDRATION SYNDROM**
- **FRAGILISATION OF CELL MEMBRANES**
- MUSCULAR PATHOLOGIES
- OVERHEATING
- ENDOCRINE IMBALANCES
- WORK ANEMIAS
- INTRABRONCHIAL HEMORRAGES
- **GASTRIC ULCERS**
- INDUCED HEART DYSFUNCTIONS
- SUDDEN DEATH SYNDROM

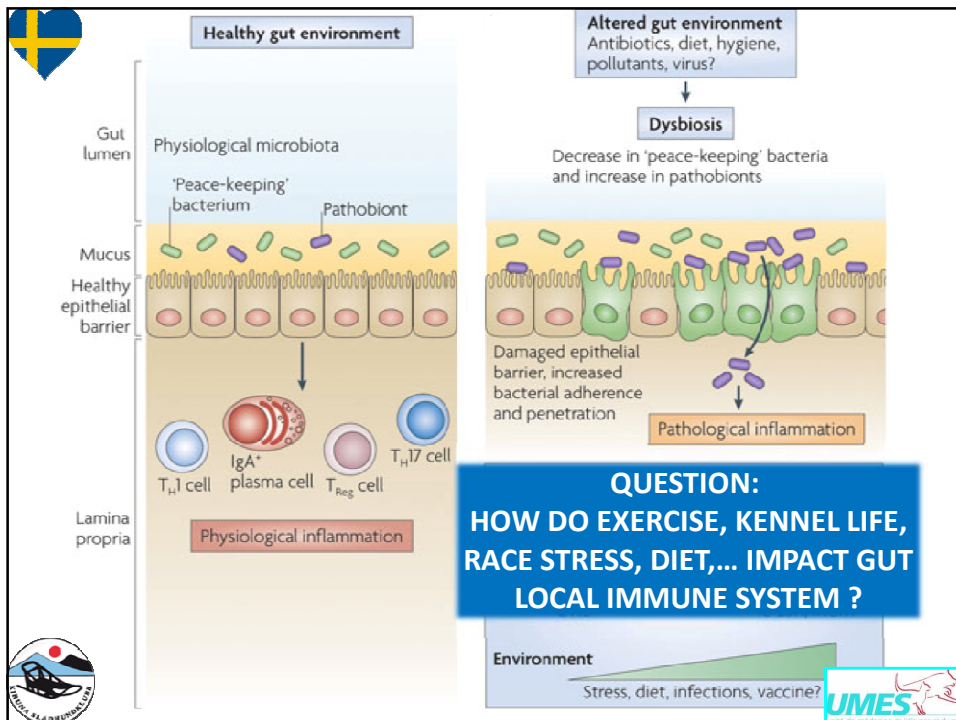
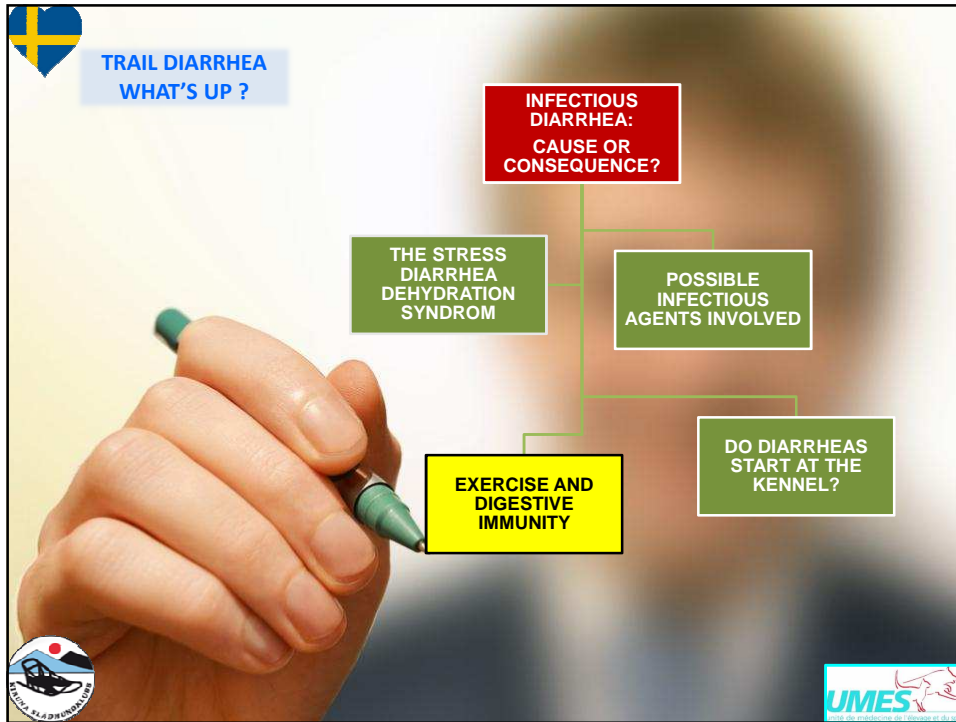


WHAT IF THINGS STARTED AT THE KENNEL ?



DEFINITLY YES...RACE DIARRHEAS CAN FIND ORIGINS AT THE KENNEL



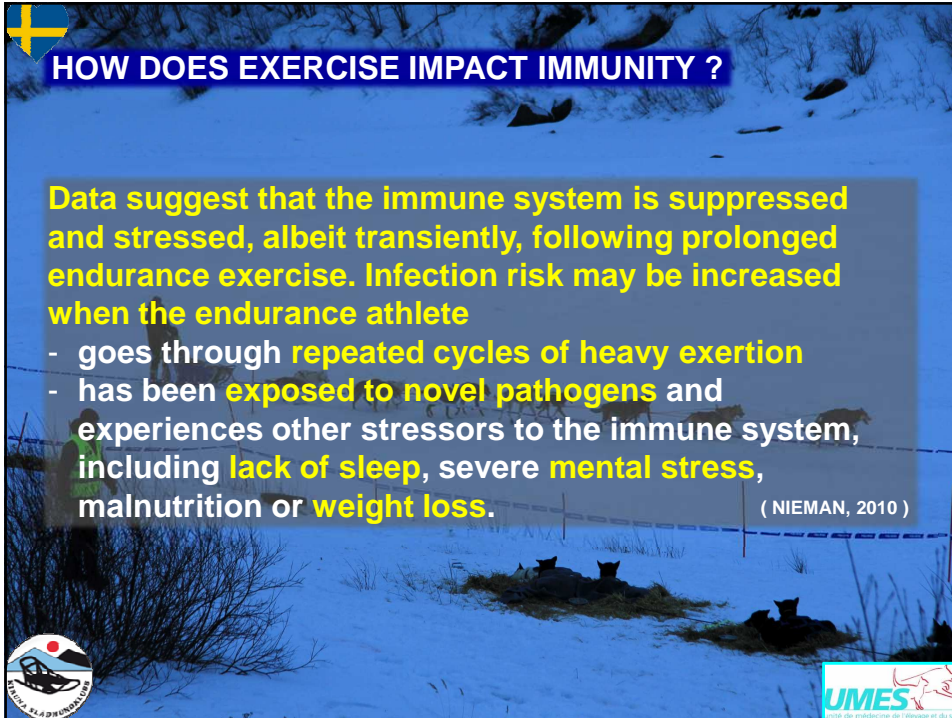


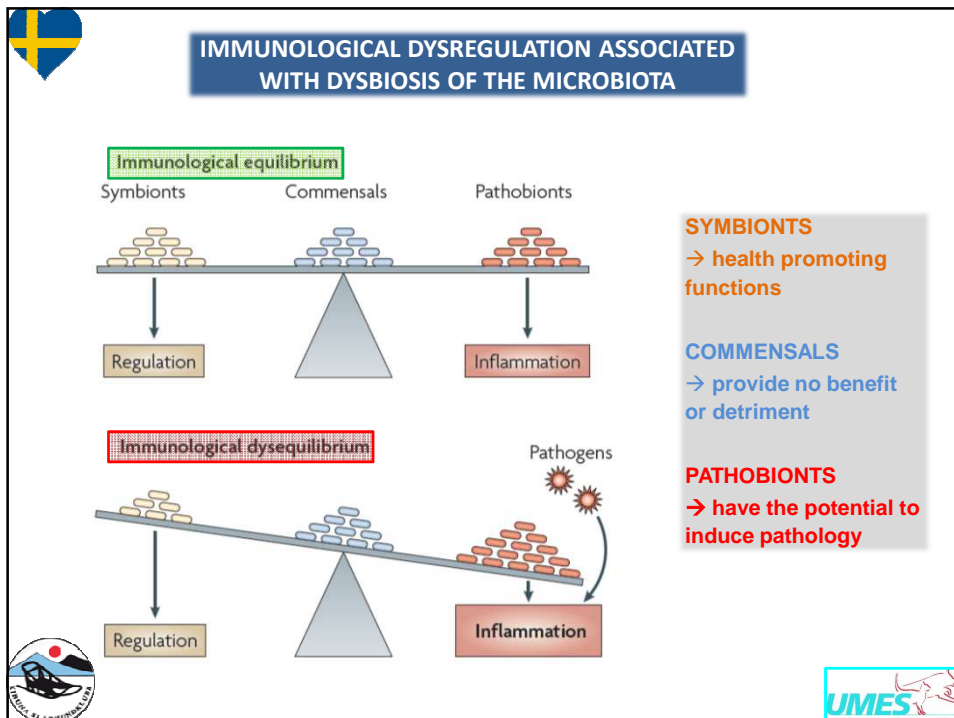


HOW DOES EXERCISE IMPACT IMMUNITY ?

Data suggest that the immune system is suppressed and stressed, albeit transiently, following prolonged endurance exercise. Infection risk may be increased when the endurance athlete

- goes through repeated cycles of heavy exertion
- has been exposed to novel pathogens and experiences other stressors to the immune system, including lack of sleep, severe mental stress, malnutrition or weight loss.

(NIEMAN, 2010)




TRAIL DIARRHEA WHAT'S UP ?

1. WHAT ABOUT READING IN THE FECES ?

2. INFECTIOUS DIARRHEA ? SOMETIMES !

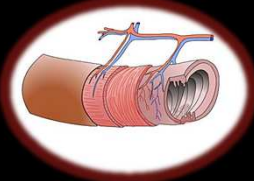
3. EFFICIENT PREVENTIVE TOOLS

4. TREATMENT: WHO SAID ANTIBIOTICS ?



DIGESTIVE TRACT: THE LARGEST SURFACE OF CONTACT BETWEEN ORGANISM AND OUTSIDE ENVIRONMENT


STRUCTURAL PROTECTION
↓
HOW CAN WE HELP MAINTAIN STRUCTURAL INTEGRITY ?

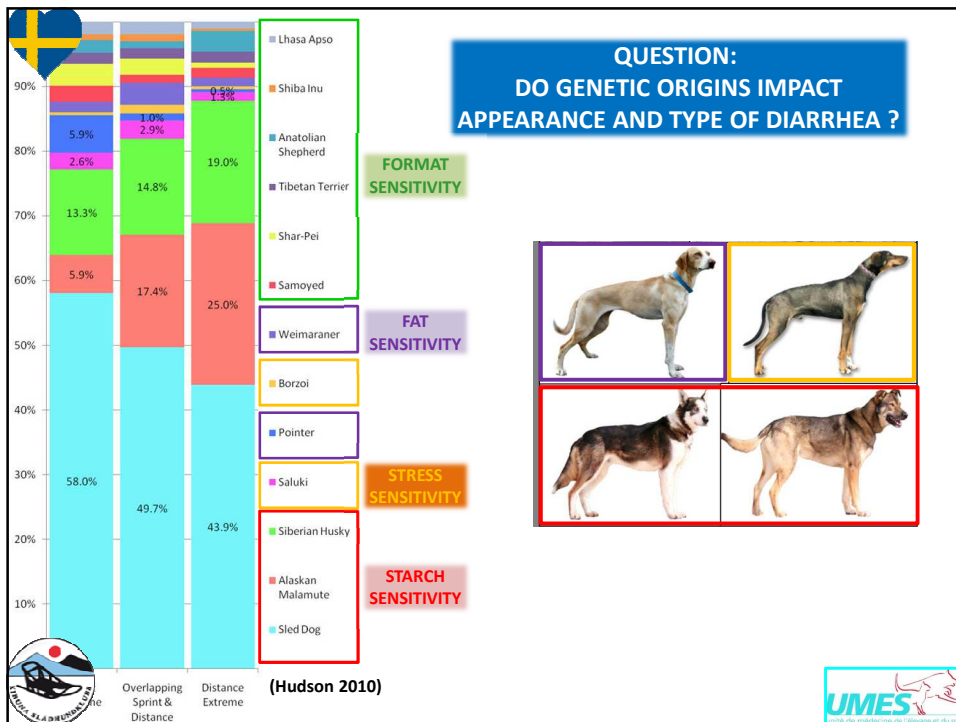


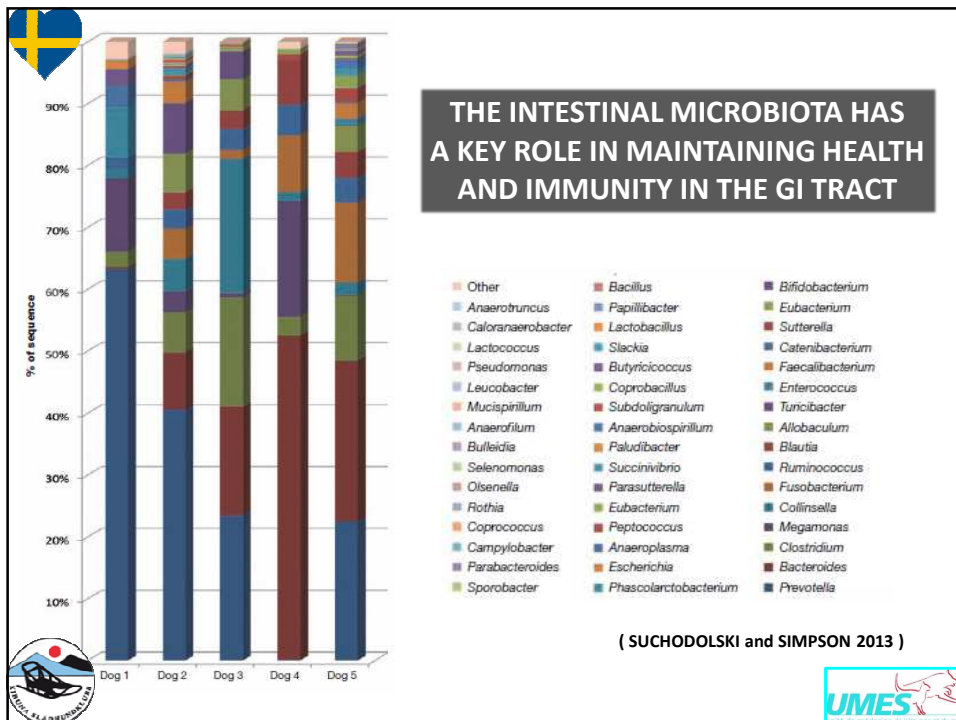
DYNAMIC PROTECTION
↓
HOW CAN WE OPTIMIZE TRANSIT FUNCTION ?




IMMUNE PROTECTION
↓
HOW CAN WE AVOID LOCAL IMMUNODEPRESSION ?











MICROBIAL DERIVED METABOLITES IN THE DOG GI TRACT


Metabolic end products	Metabolic activities of intestinal microbiota	Effect on host health
Propionate, acetate, butyrate	Carbohydrate fermentation	Anti-inflammatory, energy source of enterocytes, regulation of intestinal motility, amelioration of leaky gut barrier
Retinoic acid (Vitamin A derivate)	Vitamin synthesis	Important for generation of peripheral regulatory T-cells
Vitamin K2, B12, biotin, folate	Vitamin synthesis	Important co-factors for various metabolic pathways
Ceramide	Induces degradation of sphingomyelin via alkaline sphingomyelinase	Significant role in apoptosis and in the prevention of intestinal epithelial dysplasia and tumorigenesis
Indole	Degradation of the amino acid tryptophan	Increases epithelial-cell tight-junction resistance and attenuates indicators of inflammation
Secondary bile acids (cholate/deoxycholate)	Deconjugation/dehydroxylation of bile acids	Intestinal fat absorption
Taurine	Bacterial deconjugation of bile acids	Facilitates fat absorption from the GI tract, important for liver metabolism
Oxalyl CoA decarboxylase	Degradation of oxalate through oxalyl CoA decarboxylase	Decreases in oxalate degrading enzyme associated with increased risk for calcium oxalate urolithiasis
Ammonia	Decarboxylation, deamination of amino acids	Increases, associated with encephalopathy
Lactate	Carbohydrate fermentation	Increases, associated with encephalopathy

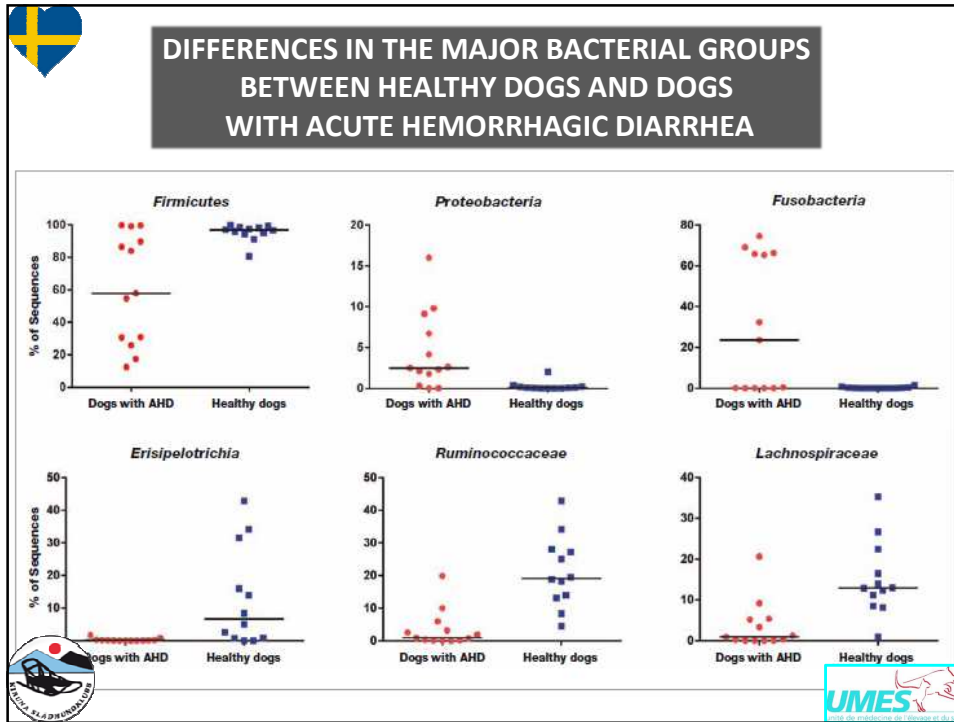



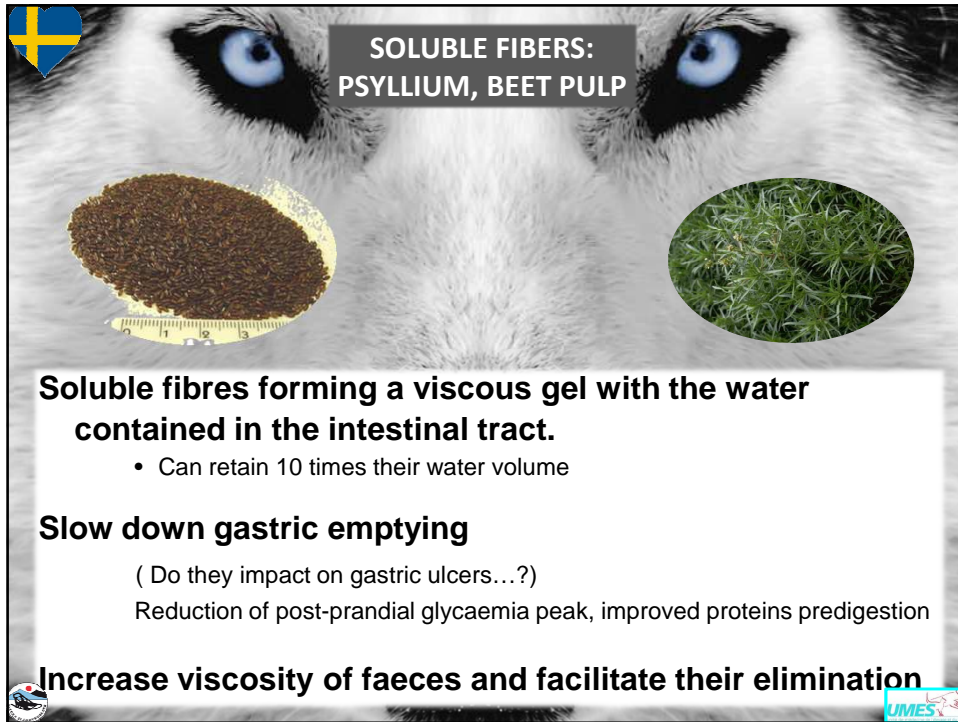
Disorder	Affected species
Acute hemorrhagic diarrhea	Dogs
Atopic dermatitis	Humans, mouse models, dogs
Autism	Humans
Calcium oxalate (CaOx) urolithiasis	Dogs
Diabetes mellitus type II	Humans, rodent models
Inflammatory bowel disease	Humans, rodent models, dogs, cats
Irritable bowel syndrome	Humans
Metabolic syndrome	Rodent models
Obesity	Mouse models
Stress diarrhea	Humans, rodent models, dogs
Stress, anxiety, depression-related behavior	Mouse models

DISORDERS ASSOCIATED WITH CHANGES IN THE INTESTINAL MICROBIOME

(SUCHODOLSKI and SIMPSON 2013)







**SOLUBLE FIBERS:
PSYLLIUM, BEET PULP**


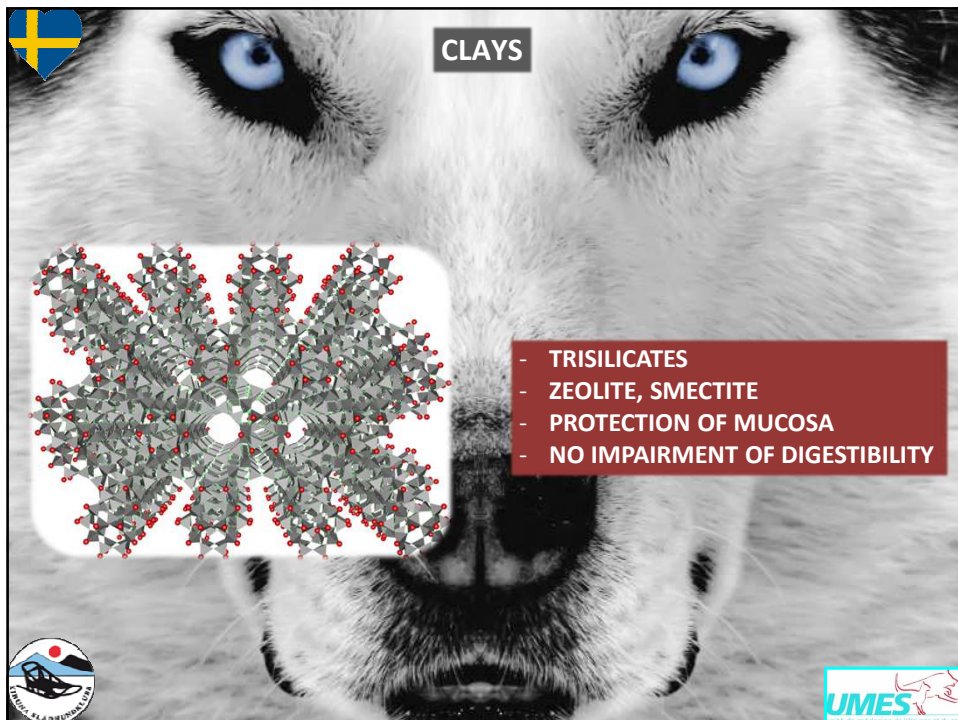
Soluble fibres forming a viscous gel with the water contained in the intestinal tract.

- Can retain 10 times their water volume

Slow down gastric emptying


(Do they impact on gastric ulcers...?)
Reduction of post-prandial glycaemia peak, improved proteins predigestion


Increase viscosity of faeces and facilitate their elimination

CLAYS


- TRISILICATES
- ZEOLITE, SMECTITE
- PROTECTION OF MUCOSA
- NO IMPAIRMENT OF DIGESTIBILITY



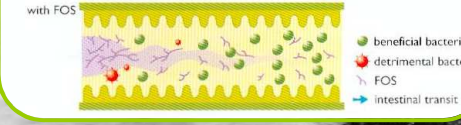


FRUCTO-OLIGOSACCHARIDES MANNAN-OLIGOSACCHARIDES

without FOS

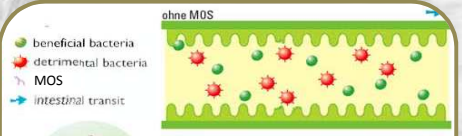


with FOS

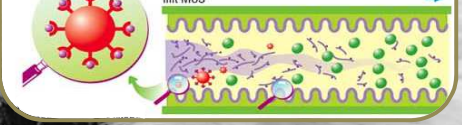


- beneficial bacteria
- detrimental bacteria
- ⌋ FOS
- intestinal transit

ohne MOS




mit MOS

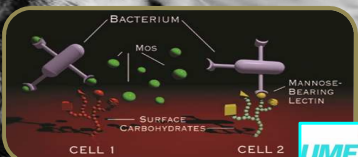




- beneficial bacteria
- detrimental bacteria
- ⌋ MOS
- intestinal transit

FROM ASPERGILLUS NIGRICANS




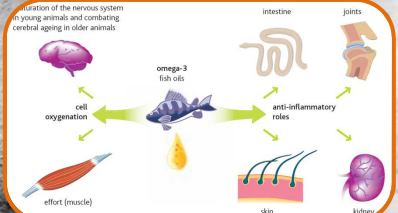
INACTIVATED SACCHAROMYCES YEAST WALLS







OMEGA 3 FATTY ACIDS





**ANTI-INFLAMMATION
IMMUNO-MODULATION
CELLULAR OXIGENATION
MEMBRANES DEFORMABILITY**





L GLUTAMINE


REDUCES INFLAMMATORY CYTOKINES RELEASE
INCREASES GLUTATHIONE (GSH)
ENHANCES HSP THAT PROTECTS ENTEROCYTES
ENERGY SOURCE FOR RAPID GROWING CELLS




ZINC

NEEDED FOR IgA AND IMMUNE FUNCTION
VERY BENEFICIAL IN CHILDREN DIARRHEAS
ENDOTHELIAL REPAIR

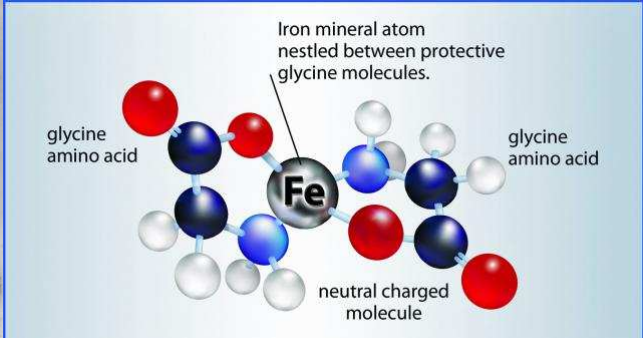


 **MINERAL SALTS AS CHELATES**


Metal Ion + **Chelate Agent** → **Metal Chelate**



Iron mineral atom nestled between protective glycine molecules.



Molecules structure of an Iron Bisglycinate Chelate



 **PROBIOTICS**



NO « MIRACLE » IN PROBIOTICS !



RACE DIARRHEAS PREVENTIVE TOOLS

GENETICS ?

MICROBIOME ?

NUTRITION ?




PRACTICAL FEEDING ?



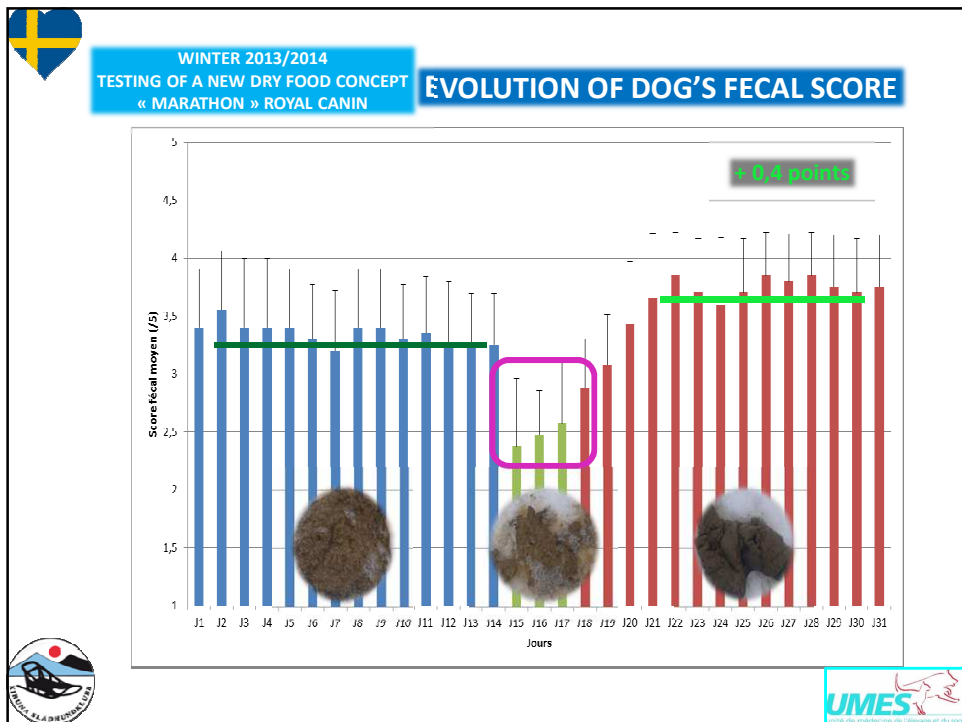
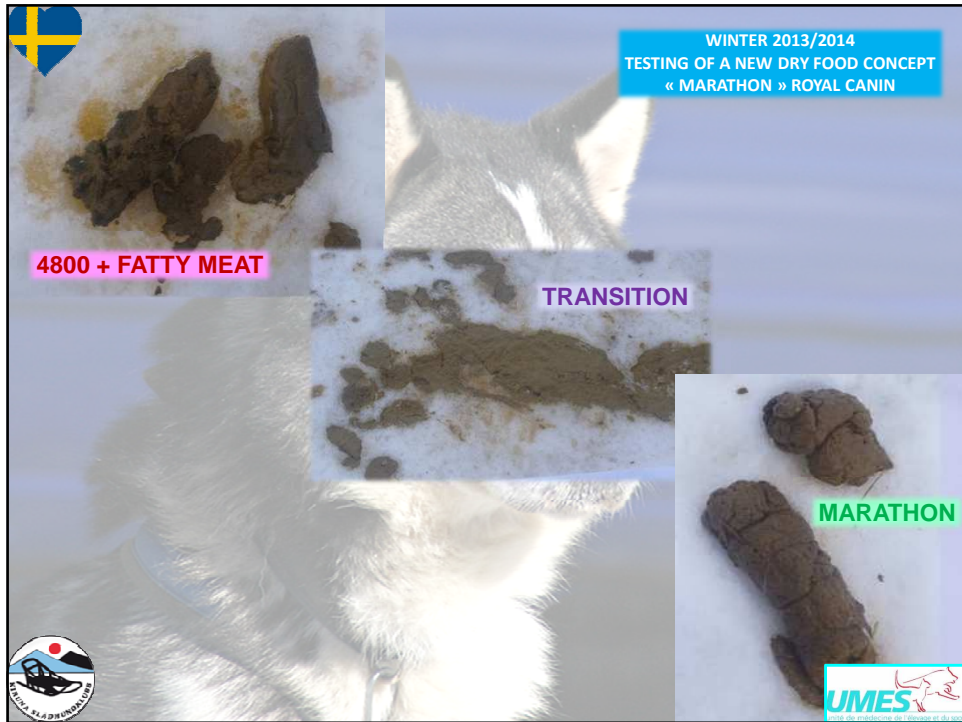
PRACTICAL FEEDING AS A PREVENTIVE TOOLS

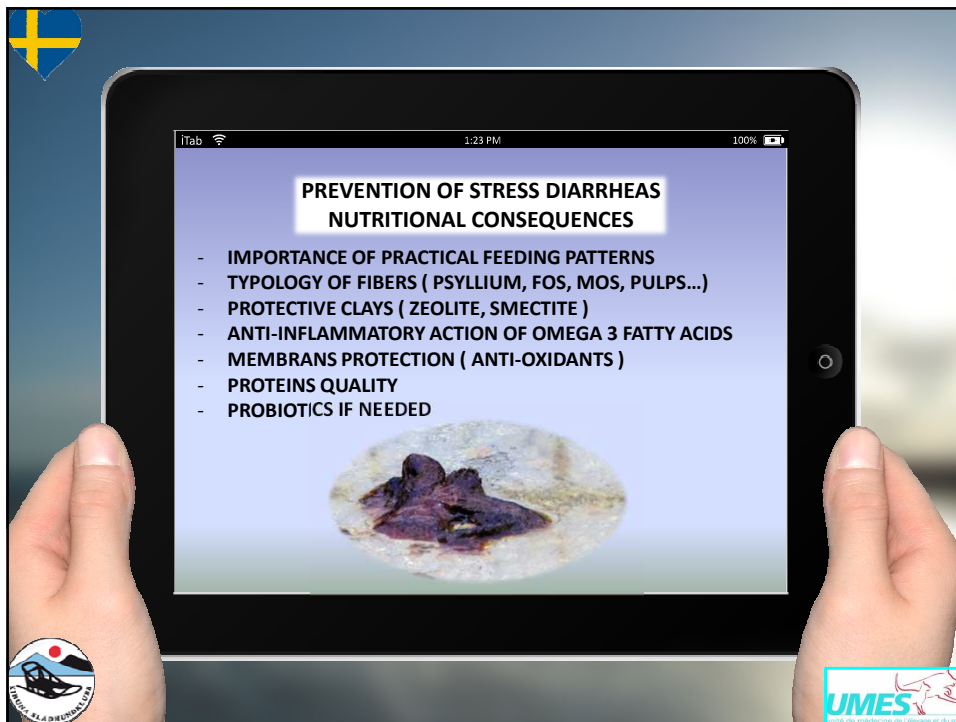
MAIN MEAL

MAIN MEAL










RACE DIARRHEAS PREVENTIVE TOOLS



PUTTING ALL TOGETHER IS THE ONLY KEY TO A REALLY EFFICIENT PREVENTION



**TRAIL DIARRHEA
WHAT'S UP ?**






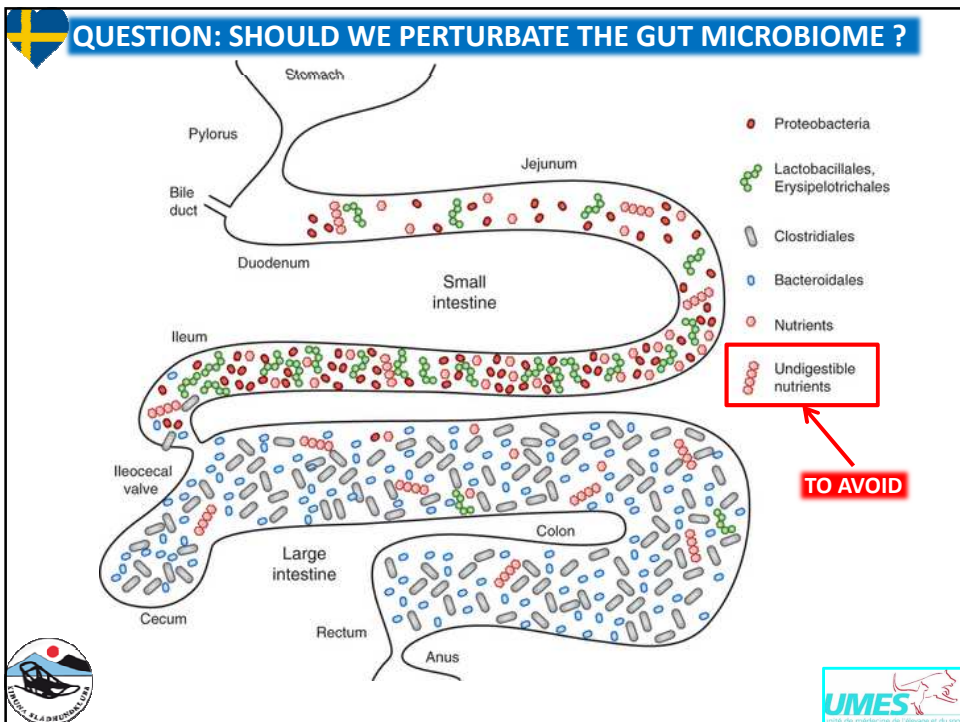
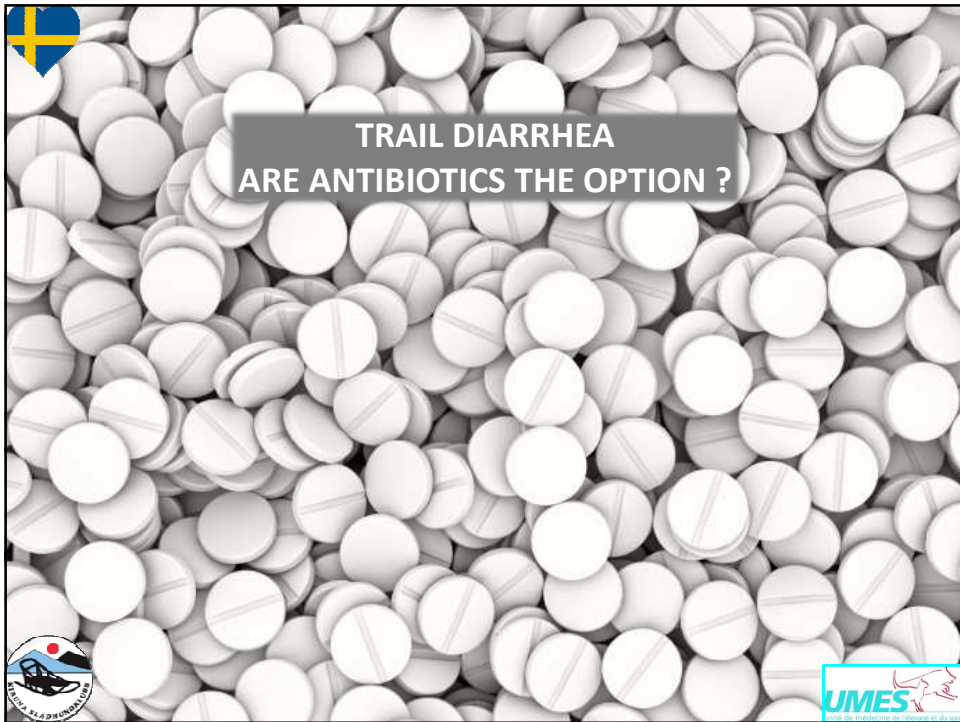
1. WHAT ABOUT READING IN THE FECES ?


2. INFECTIOUS DIARRHEA ? SOMETIMES !

3. EFFICIENT PREVENTIVE TOOLS

4. TREATMENT: WHO SAID ANTIBIOTICS ?









NUTRIENTS SYNTHESIZED BY NORMAL GUT FLORA

- Biotin
- Cobalamin
- Folic acid
- Pantothenic acid
- Pyridoxine
- Riboflavin
- Vitamin K
- Butyric acid
- Amino acids

GUT MICROBIAL DETOXIFICATION

- Demethylate methylmercury
- Degrade N-nitrosamines
- Degrade polycyclic aromatic hydrocarbons
- Degrade aflatoxin B1 (limited)
- Hydrolyze guanidinosuccinic acid






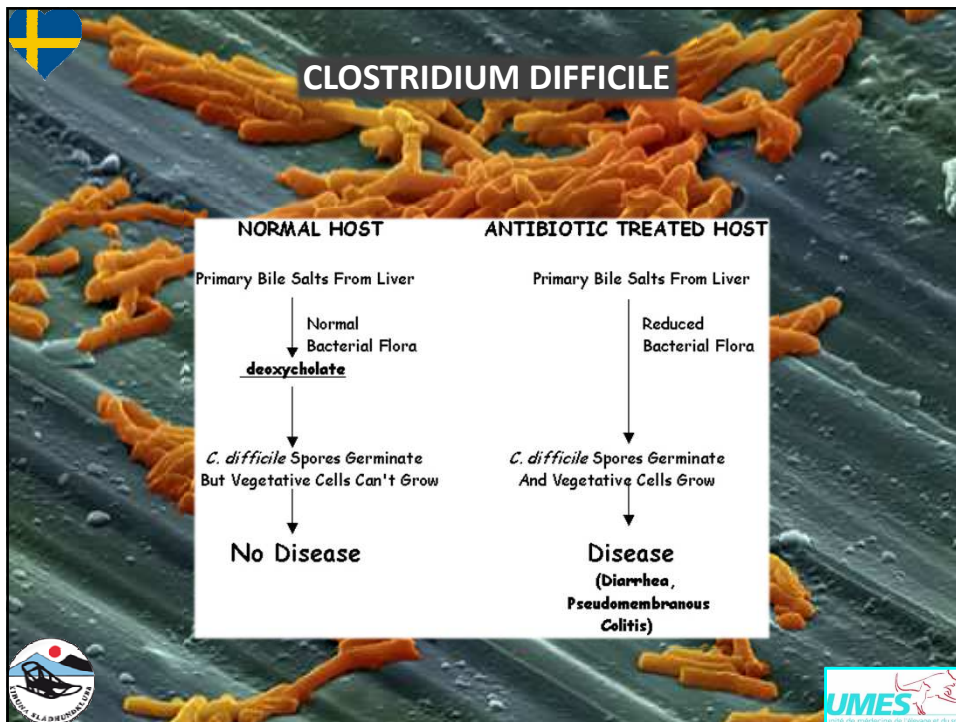
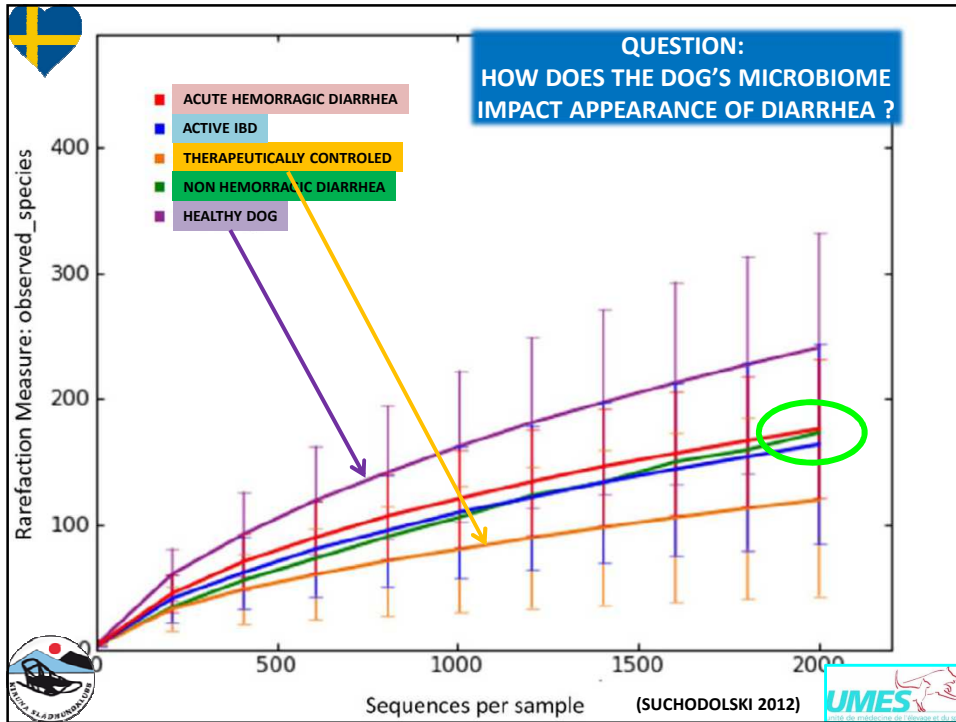
IMMUNOLOGIC EFFECTS OF NORMAL GI MICROFLORA

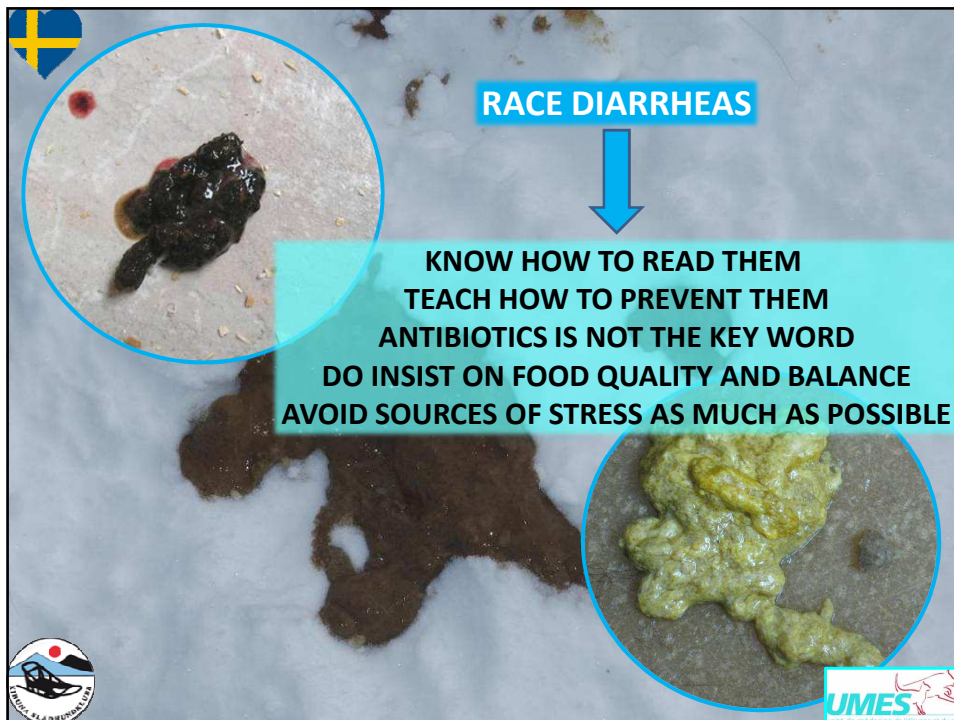
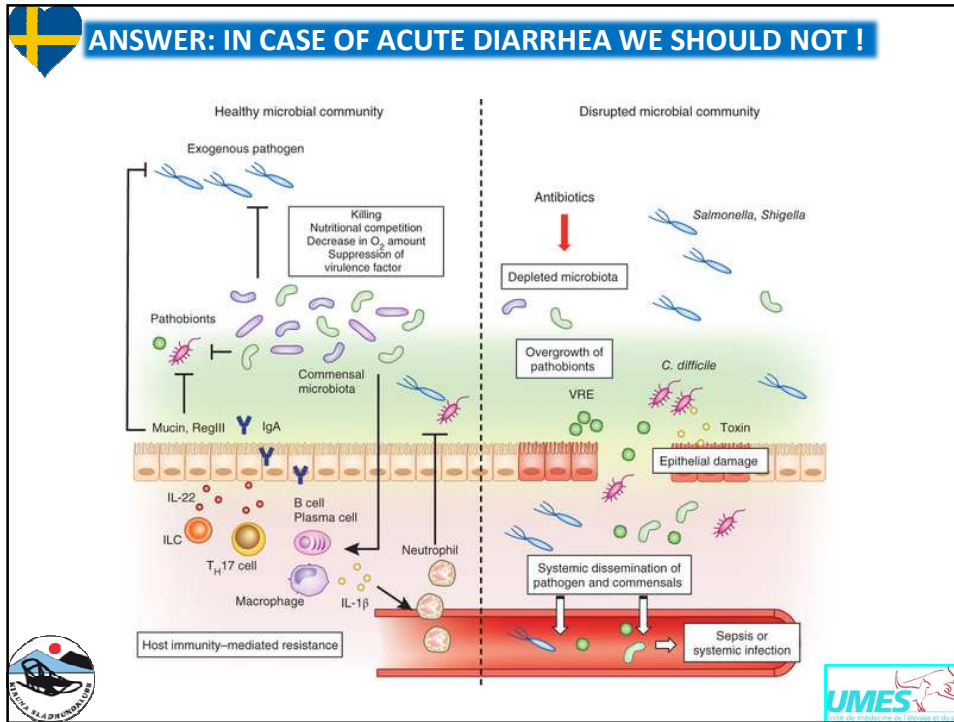
- Enhance cell immunity
- Increase Immunoglobulin synthesis
- Increase Complement level
- Stimulate immune response

GI FLORA PROTECTS AGAINST GI PATHOGENS

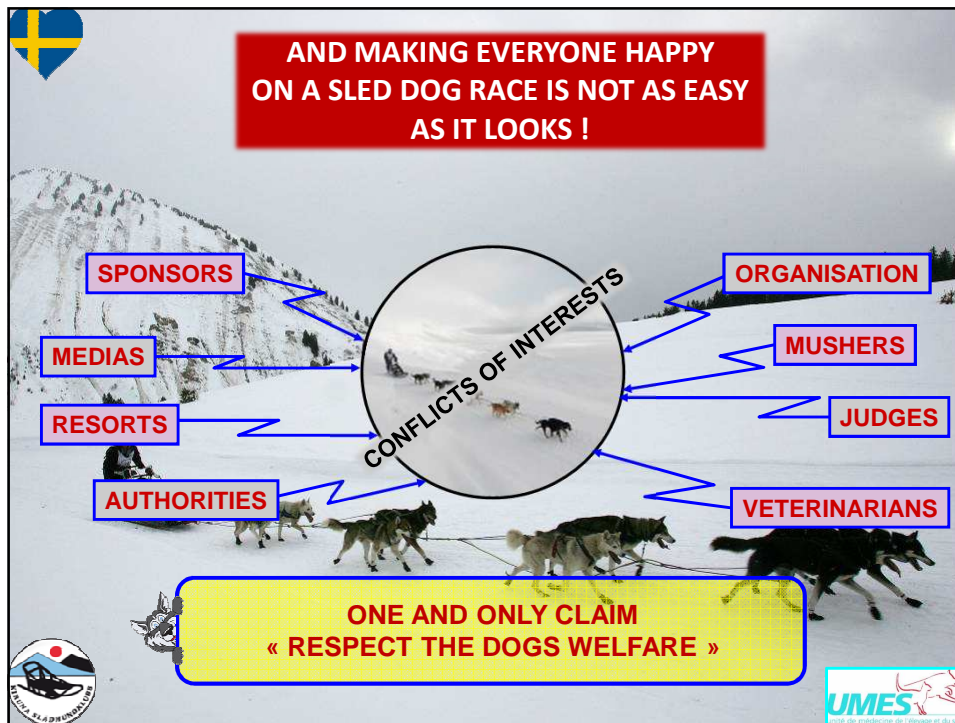
- Synthesis of SCFA
- Synthesis of antibiotics
- Competition for nutrients
- Deconjugation of bile salts
- Blockage of adherence receptors
- Degradation of bacterial toxins











WHY WERE STAGE RACES BORN WITH ALPIROD IN 1988 ?

- ALPS: HUDGE MEDIAS AND PUBLIC EXPOSURE
- VETERINARIAN INVOLVED IN THE BASIC CONCEPT DISCUSSIONS
- LONG DISTANCE VETERINARY APPROACH NOT AS ACUTE AS TODAY

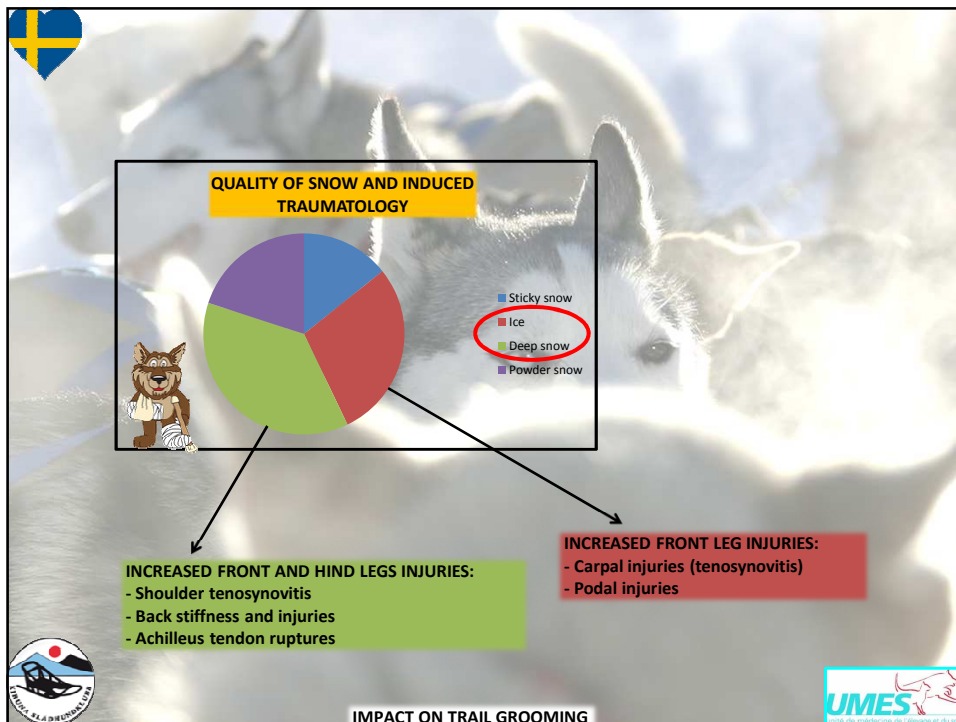
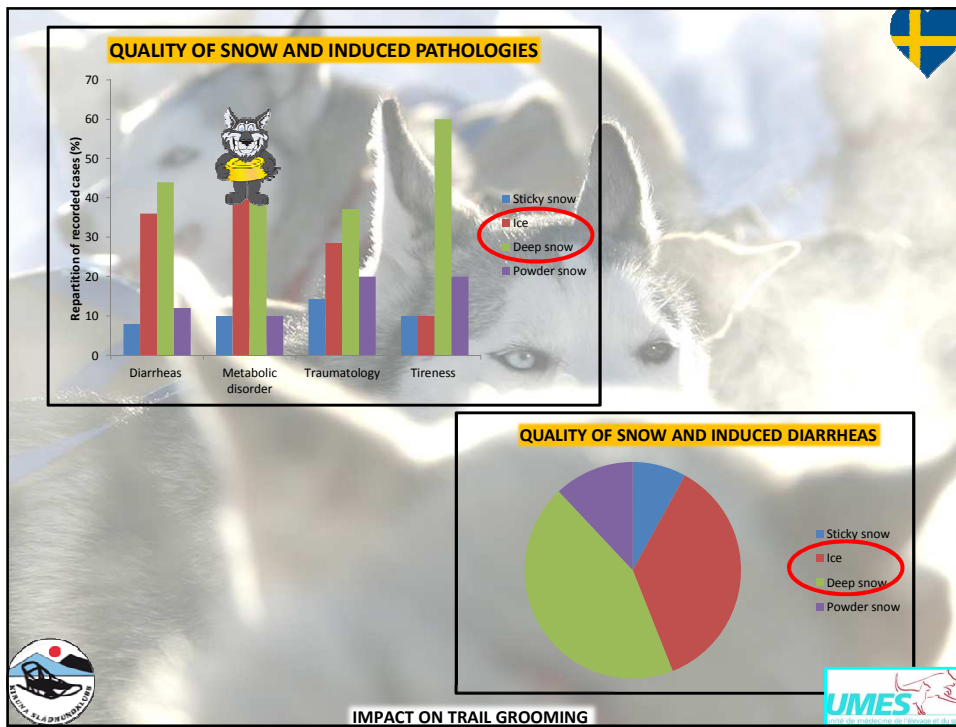
WHY A POOL OF RACING DOGS INSTEAD OF A CLASSIC RACING TEAM ?


- KIND OF A SCANDAL AMONG MUSHERS AT THAT TIME...
- BUT ON A VETERINARY POINT OF VIEW THE FRIENDLIEST WAY TO DO
- MODIFIED RACE STRATEGIES
- MODIFIED RACE TRAINING

WHY INTRODUCE THE NOTION OF TEMPORARY DROPPED DOGS ?

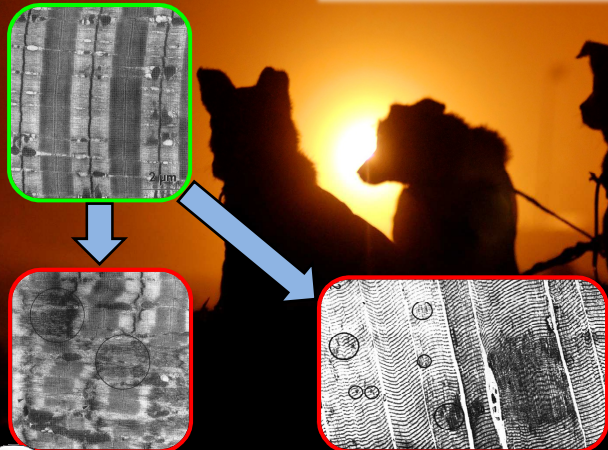
- SOME PROBLEMS CAN BE SOLVED WITH A BIT OF REST AND VET ATTENTION
- AVOIDANCE OF OVER-RACING AFFECTIONS










2013 : 4 CASES OF RHABDOMYOLISIS...
...BUT SOFT DEEP SNOW IN FIRST STAGES DUE TO TOO LATE LOCAL GROOMING OF TRAILS.
2014 : TRAILS IN THIS AREA WILL BE GROOMED EARLIER IN THE SEASON...AND WERE FINALLY NOT !



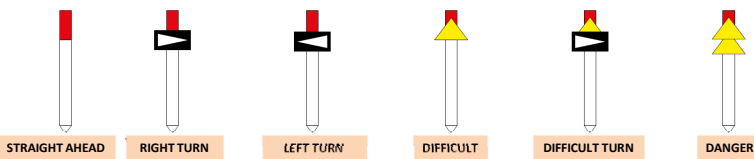

Multiple micro-lesions can lead to rupture or rhabdomyolysis





IMPACT ON TRAIL GROOMING

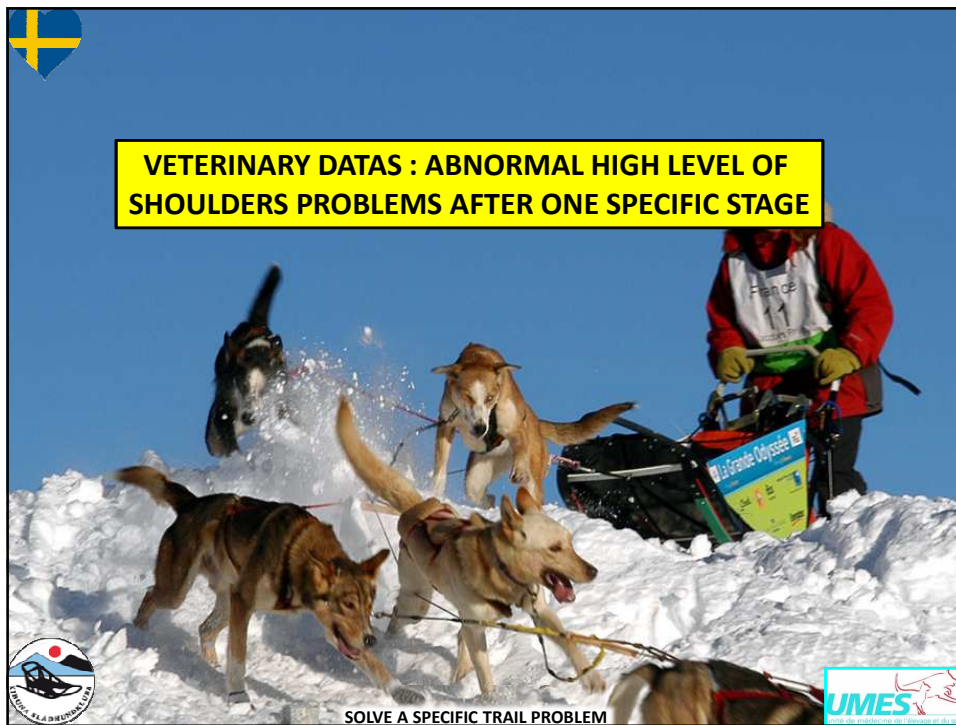
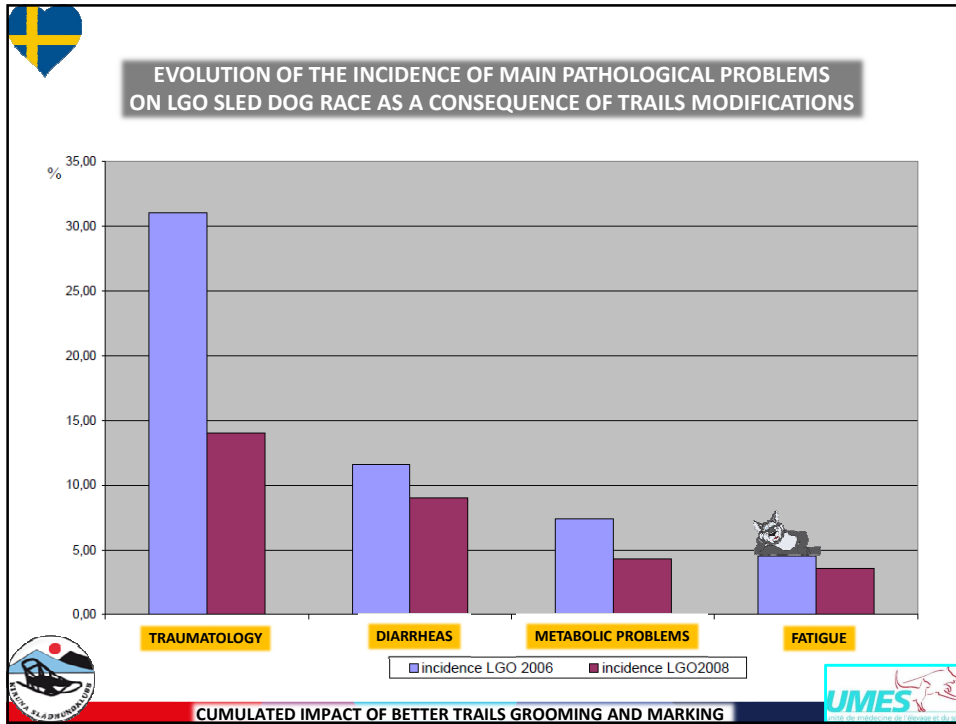


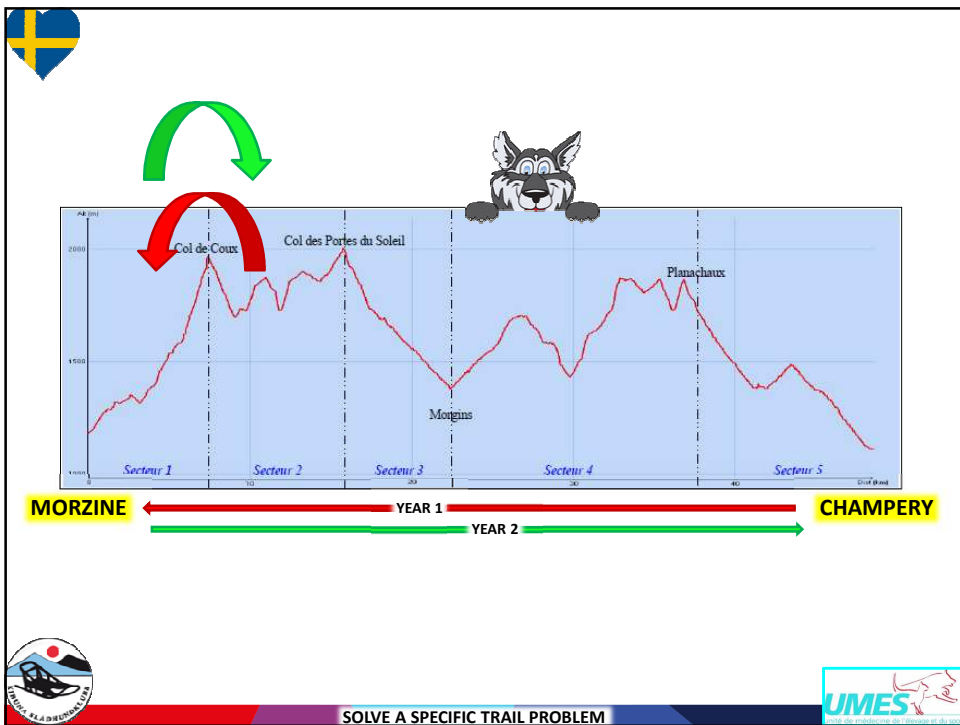
QUALITY OF MARKING



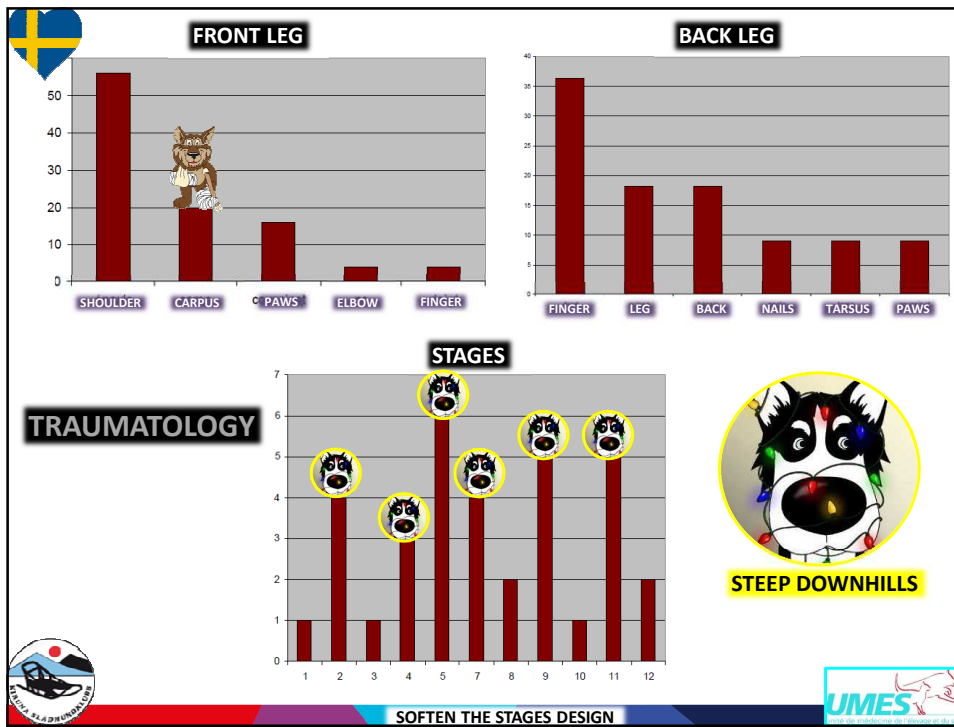
IMPACT ON TRAIL MARKING














NIGHT RUNS ARE ALWAYS SAFER

BUT :

- Medias
- Sponsors
- Spectators
- Resorts



SOFTEN THE STAGES DESIGN



BACK MUSCLE PROBLEMS

