Gastric ulcerations

2. CLINICAL APPROACH

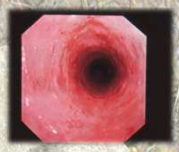
- Dramatic cases are rare
- Unexplained vomiting
- Blood in the vomitus
- Sudden death

Gastric ulcers in racing sled dogs

➥ Studies conducted during Iditarod 2000 and 2001
[Davis, Oklahoma State University]

Prevalence of gastric ulceration, erosion, hemorrage or dropped dogs

- 35 p100 in 2000
  48.5 p100 in 2001



➥ Study on the relation between durantion of exercise and gastric diseases
[Davis, Oklahoma State University]

- 42 dogs randomly chosen for examination after 1 to 5 consecutive days of running 100 miles/days

Endurance exercise increases intestinal protein loss
Substancial exercise causes gastric alterations

Gastric ulcers in working dogs

➥ Study conducted on beagles
[Bersenas, Ontario Veterinary College]

Ranitidine [Zantac]
Fanotidine [Pepcid]
Pantoprazole [Protonox]
Omeprazole [Mopral]

➥ Study on Racing alaskan huskies
[Wialliamson, Oklahoma Sate University]]

Famotidine [Pepcid] is effective in reducing the severity of exercise-induced gastric diseases
↳ 22 mg/dog/peros/24 hours

THE STRESS-DIARRHEA-DEHYDRATION SYNDROM

➔ Stool frequency, volume, consistency, color highly variable

➔ Extracellular dehydration (electrolytes losses)

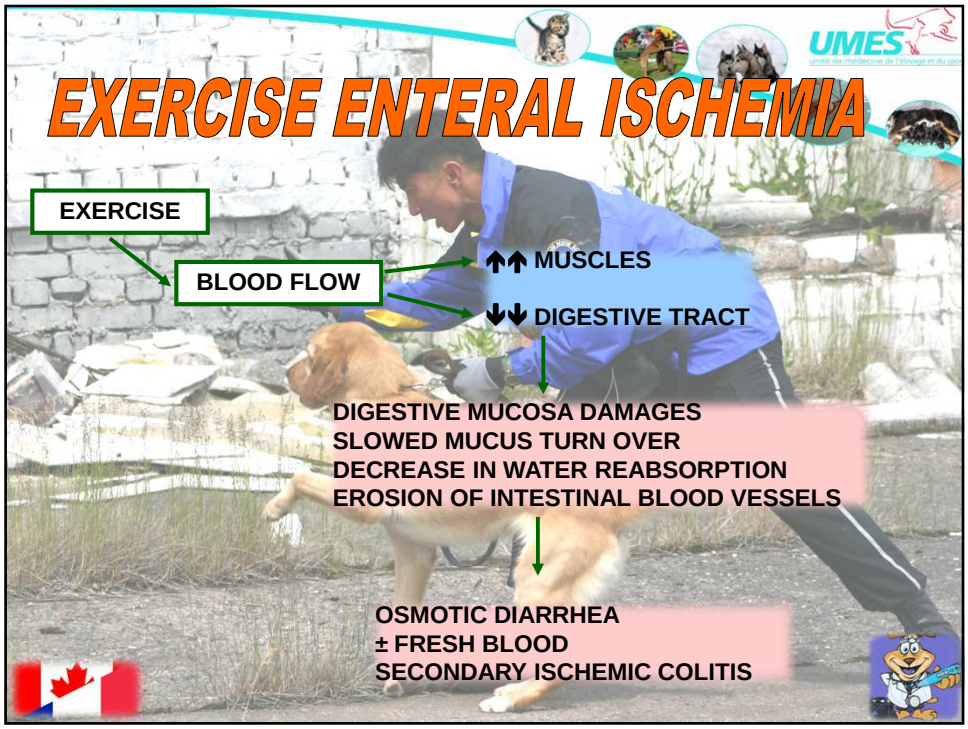
➔ Cachexia (nutrient losses)

➔ Anorexia

➔ ± vomiting, ± hyperthermia

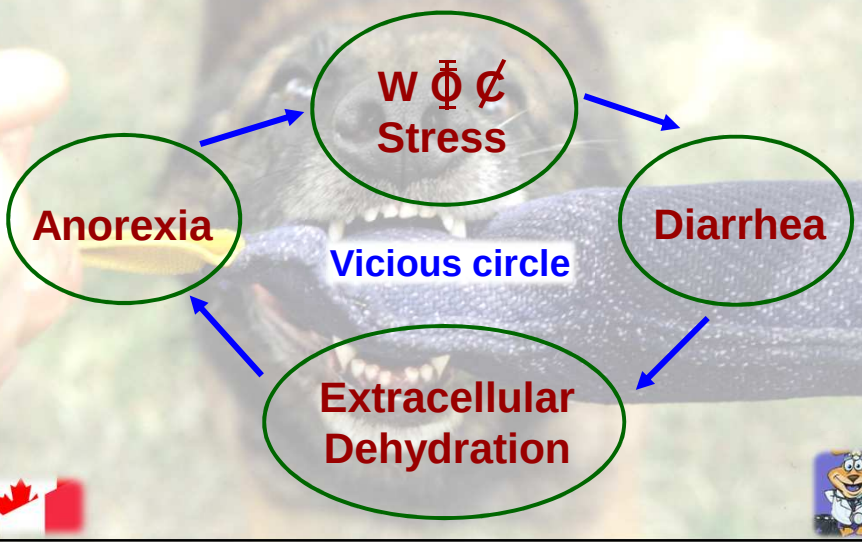
➔ ± tenesmus

➔ ± melana and/or hematochezia


EXERCISE ENTERAL ISCHEMIA
EXERCISE
BLOOD FLOW
↑↑ MUSCLES
↓↓ DIGESTIVE TRACT
DIGESTIVE MUCOSA DAMAGES
SLOWED MUCUS TURN OVER
DECREASE IN WATER REABSORPTION
EROSION OF INTESTINAL BLOOD VESSELS
OSMOTIC DIARRHEA
± FRESH BLOOD
SECONDARY ISCHEMIC COLITIS


OTHER FACTORS INVOLVED IN "STRESS" DIARRHEA
➔ "CAECAL SLAP SYNDROM"
- Microtraumas of the mucosa
- Too much iron in the diet
➔ "RUNNER'S TROT"
- Uncontrolled spasmodic contractions of colonic muscles
- Soreness, tenesmus and bloody diarrhea
➔ INDUCED EXTRACELLULAR DEHYDRATION

Stress Diarrhea Dehydration Syndrom



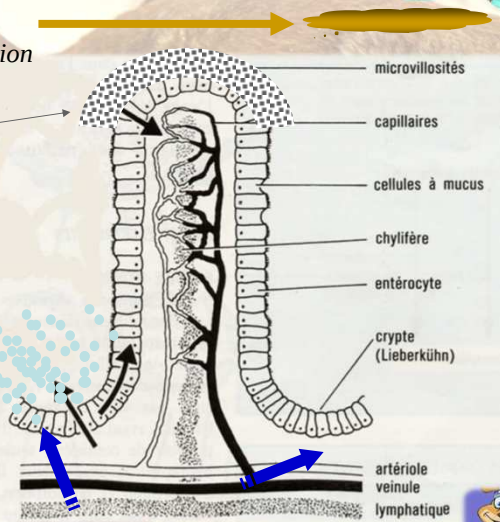
Nutritional prevention of stress diarrhea

1 /Beet pulp
facilitate transit and formation of moulded stools

2/ Zeolite
Protects mucosa ("intestinal bandage")

3/ FOS / MOS
Stimulate bacterial flora nourish mucosa

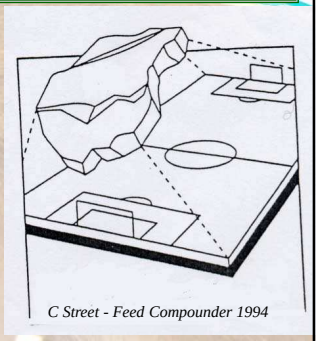
4/ Fish oil (EPA/DHA)
anti-inflammatory role



Clays : properties of Zeolite and Smectite

A great surface of exchange

surface of exchange corresponding to 1 g of zeolite : hundreds of m²/g



C Street - Feed Compounder 1994

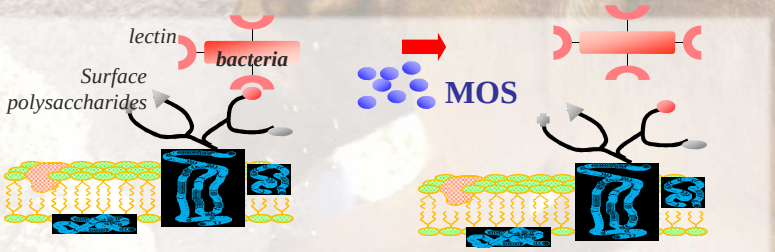
Very high porosity

Absorption of excess water in the intestine (up to 50 % of its own volume)

Mannan-Oligo-Saccharides (MOS)

Non fermentable fibres

- Double action at the intestinal level:
  1) Lure effect / pathogenous bacteria



2) « Booster » effect upon local immunity : increased production of IgA(O 'Carra 1996, 1997)

FOS : regulation effect upon bacterial flora

F.O.S.

↓

Growth of bifidobacteria & lactobacillus

↓

Production of lactate, acetate, propionate, butyrate

↓

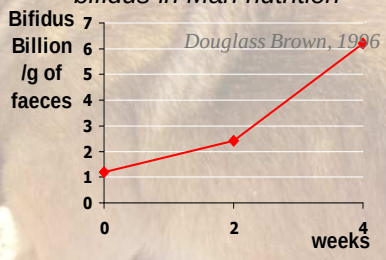
Acidification of the intestinal content

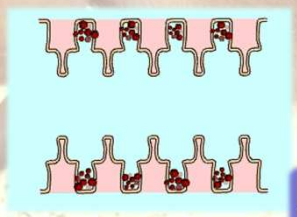
↓

Limits proliferation of pathogenous bacteria
(Clostridia, E. Coli, Salmonella…)

= Barrier effect

Effect of 1g FOS /day upon bifidus in Man nutrition





Mucilages : Psyllium

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

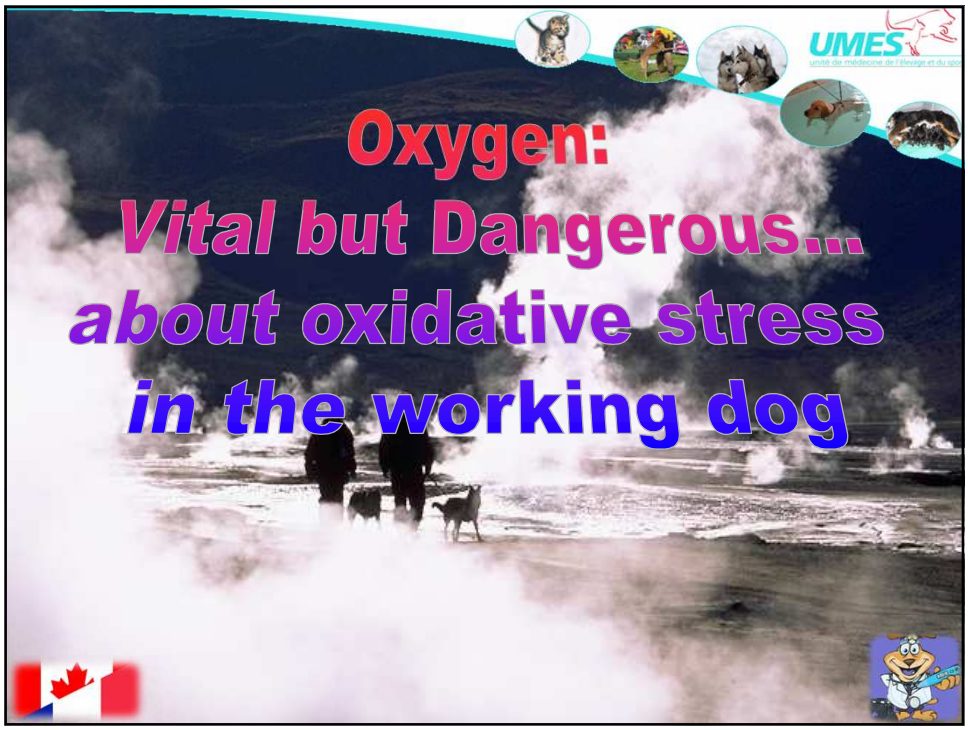
- Can retain 10 times their water volume

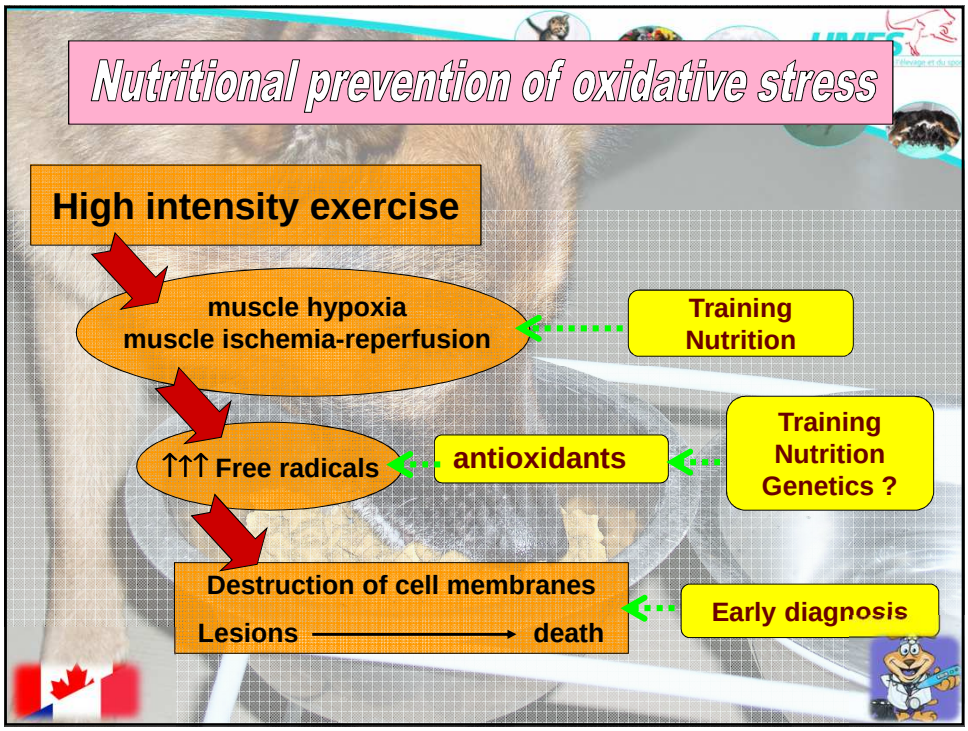
Slow down gastric emptying

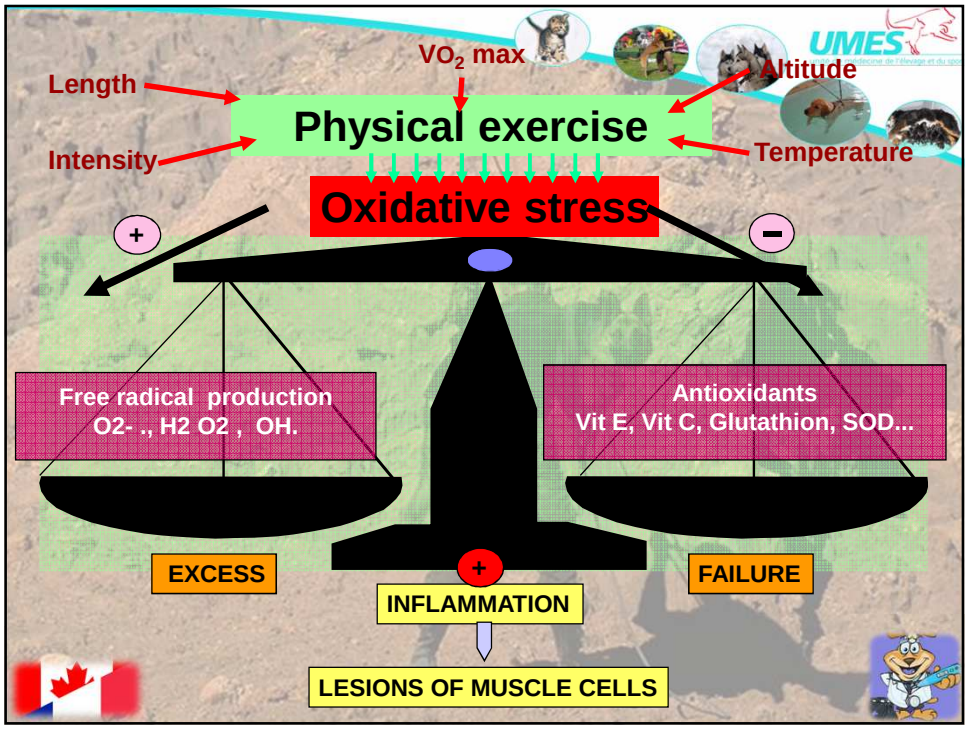
Reduction of post-prandial glycaemia peak

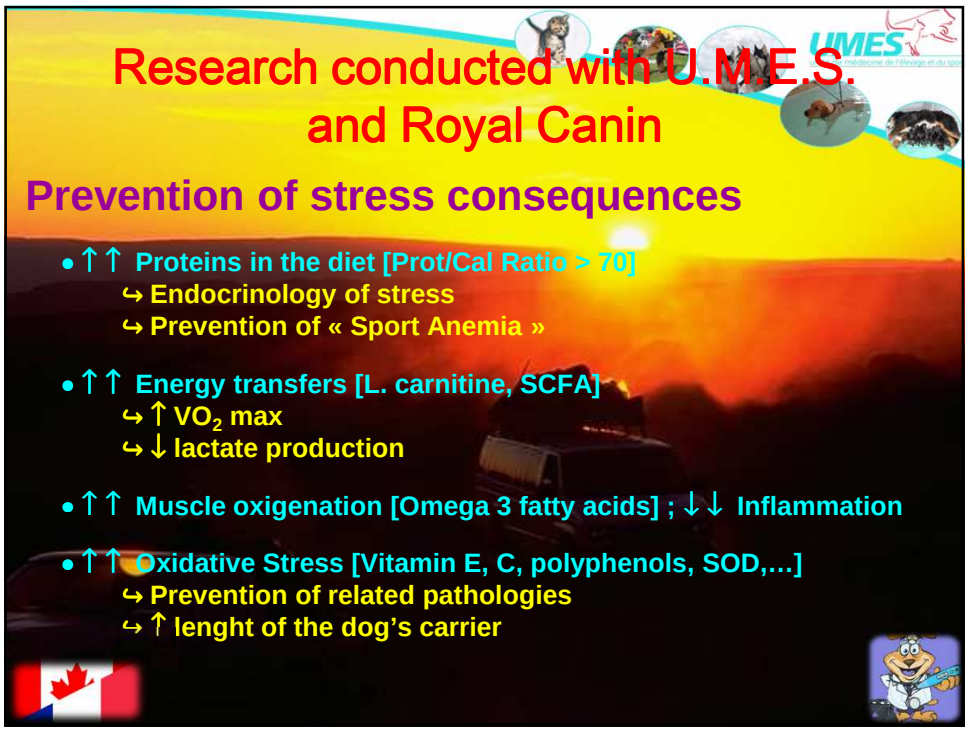
***Increase* viscosity of faeces and facilitate their elimination**

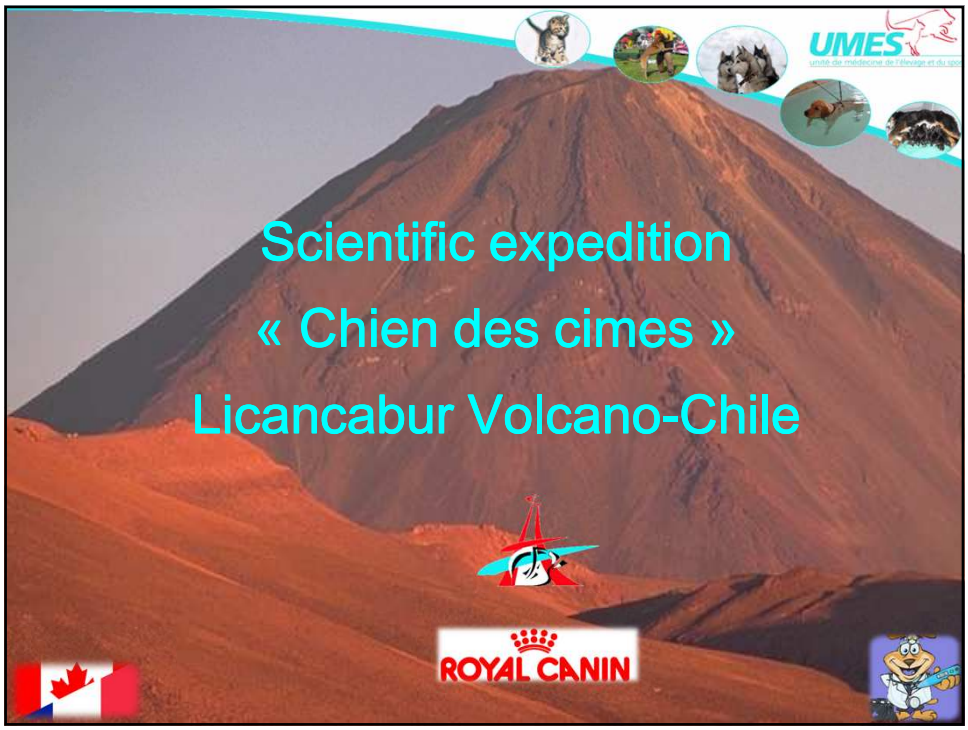
- Psyllium is suggested in case of constipation in Man


UMES
Oxygen:
Vital but Dangerous...
about oxidative stress
in the working dog


Nutritional prevention of oxidative stress
High intensity exercise
muscle hypoxia
muscle ischemia-reperfusion
Training
Nutrition
↑↑↑ Free radicals
antioxidants
Training
Nutrition
Genetics ?
Destruction of cell membranes
Lesions
death
Early diagnosis

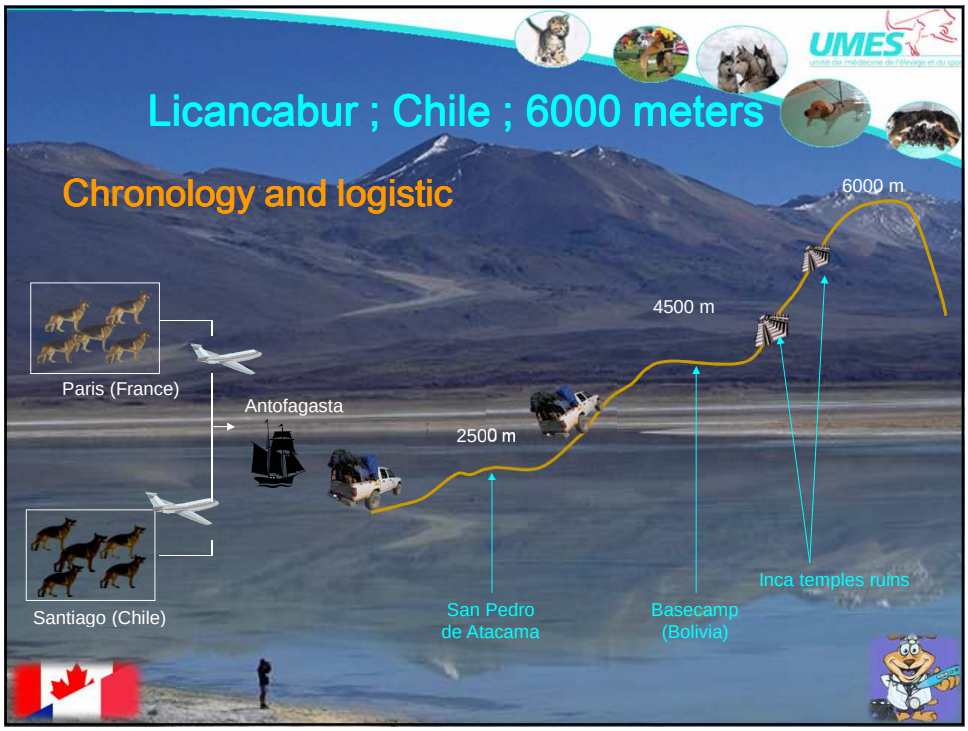

VO_2 max
Length
Altitude
Physical exercise
Intensity
Temperature
Oxidative stress
+
−
Free radical production
O2- ., H2 O2 , OH.
Antioxidants
Vit E, Vit C, Glutathion, SOD...
EXCESS
+
FAILURE
INFLAMMATION
LESIONS OF MUSCLE CELLS

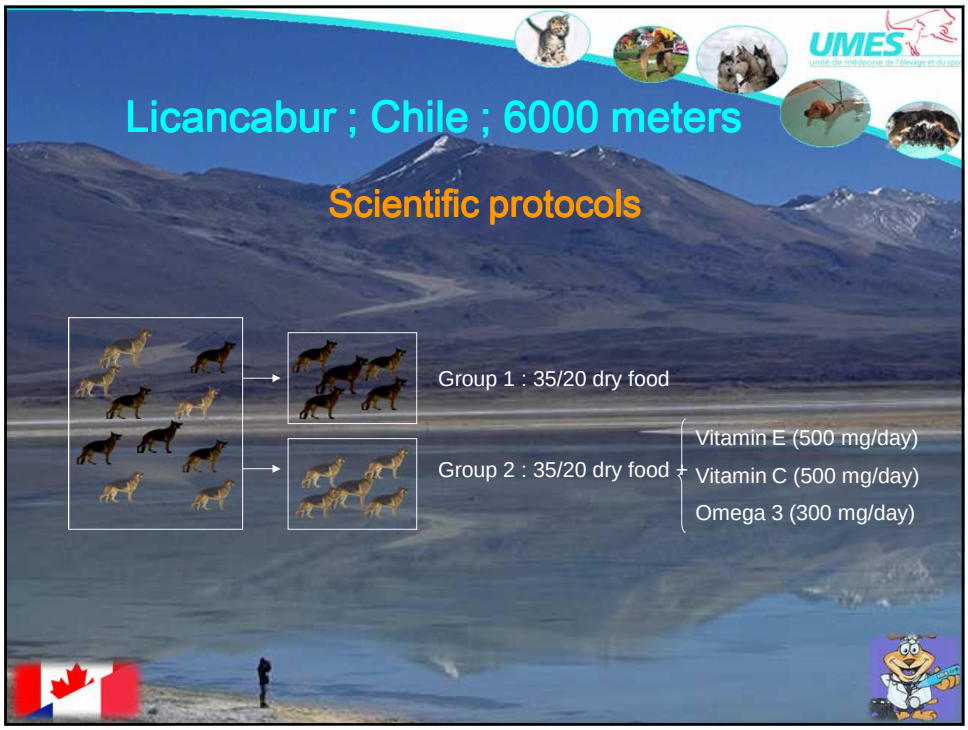

Research conducted with U.M.E.S. and Royal Canin
Prevention of stress consequences
• ↑↑ Proteins in the diet [Prot/Cal Ratio > 70]
↳ Endocrinology of stress
↳ Prevention of « Sport Anemia »
• ↑↑ Energy transfers [L. carnitine, SCFA]
↳ ↑ VO_2 max
↳ ↓ lactate production
• ↑↑ Muscle oxigenation [Omega 3 fatty acids] ; ↓↓ Inflammation
• ↑↑ Oxidative Stress [Vitamin E, C, polyphenols, SOD,...]
↳ Prevention of related pathologies
↳ ↑ lenght of the dog's carrier


UMES
Scientific expedition
« Chien des cimes »
Licancabur Volcano-Chile
ROYAL CANIN


UMES
Licancabur ; Chile ; 6000 meters
Scientific goals
↳ Effects of acute altitude hypoxia on working dogs
↳ Clinical and behavioural modifications induced
↳ Interest of a nutritionnal antioxidant prevention
versus consequences of acute mountain disease in the dog
ROYAL CANIN


Licancabur ; Chile ; 6000 meters
Members of the expedition
Brigade de Sapeurs Pompiers de Paris
Carabinieros de Chile
Unité de Médecine de l'Elevage et du Sport
Royal Canin Research Center
Logistics and media crew
10 dogs
20 people
UMES


Licancabur ; Chile ; 6000 meters
Chronology and logistic
6000 m
4500 m
2500 m
Paris (France)
Antofagasta
Santiago (Chile)
San Pedro
de Atacama
Basecamp
(Bolivia)
Inca temples ruins
UMES


UMES
Licancabur ; Chile ; 6000 meters
Scientific protocols
Group 1 : 35/20 dry food
Group 2 : 35/20 dry food +
Vitamin E (500 mg/day)
Vitamin C (500 mg/day)
Omega 3 (300 mg/day)


UMES

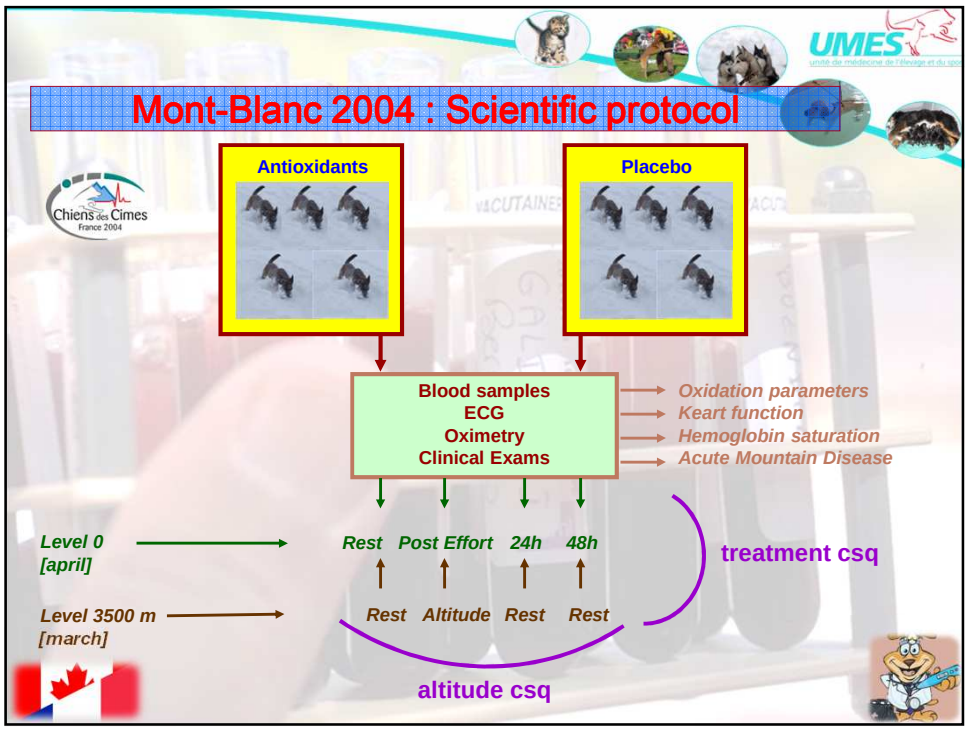

UMES
Licancabur ; Chile ; 6000 meters
Biological and nutritional consequences of worrk at high altitude in search and rescue dogs :
The scientific expedition Chiens des Cimes-Licancabur
The journal of nutrition, Vol. 128, No 12S, December 1998, 2694S-2697S
Group 2 >> Group 1
Plasma vitamin E ↑
Peroxidation Resistance Index ↑
Oxygen transfer to working cells ↑
Clinical problems ↓↓
- stress diarrhea
- muscle stiffness and rhabdompolysis
- acute pulmonary oedema


UMES
Chiens des Cimes
France 2004


«Chiens des cimes
Mont-Blanc»
4500 m Chamonix (France)
intervet
UMES

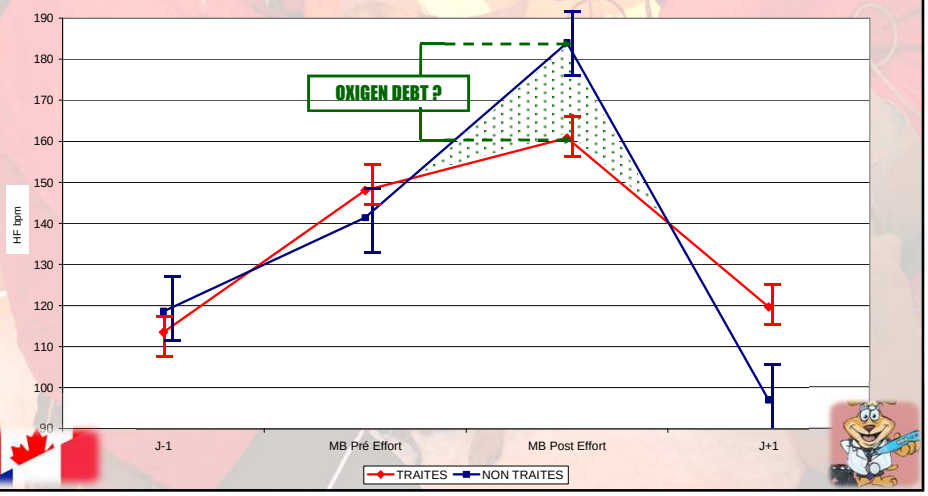

Search…
…and 20mn exercise - 4000m
Drop
Level 0
Post effort test 4000m


Mont-Blanc 2004 : Members
SARD Teams
Scientific Teams
Media Teams
UMES
ROYAL CANIN
CANINE HEALTH NUTRITION
intervet
gamma
presse images
RMC
INFO TALK SPORT
Partenaires
Julbo
PETZL


Mont-Blanc 2004 : Scientific protocol
UMES
Chiens des Cimes
France 2004
Antioxidants
Placebo
Blood samples
ECG
Oximetry
Clinical Exams
Oxidation parameters
Keart function
Hemoglobin saturation
Acute Mountain Disease
Level 0
[april]
Level 3500 m
[march]
Rest
Post Effort
24h
48h
Rest
Altitude
Rest
Rest
treatment csq
altitude csq

Mont-Blanc 2004 : Scientific protocol

Heart frequency



Mont-Blanc 2004 : Results

ECG

Sinusal Respiratory Arythmia

Physiological in well trained working dogs

Dog : Tarun

Mont-Blanc 2004 : Results

ECG

QRS Complex - Work in altitude - Treated group

ST sub segment :

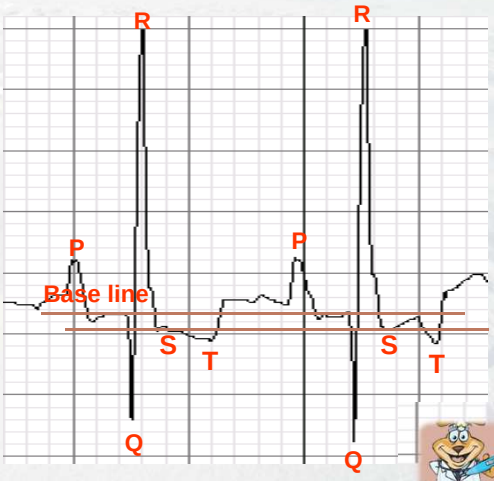
Baseline / ST segment

=> Witness of myocardiac hypoxia

-0,2 mV < NORMAL < + 0,15 mV

Hard work in altitude

Treated group : OK



Dog : Patcho

Mont-Blanc 2004 : Results

ECG

QRS Complex - Work in altitude - No treated group

ST sub segment :

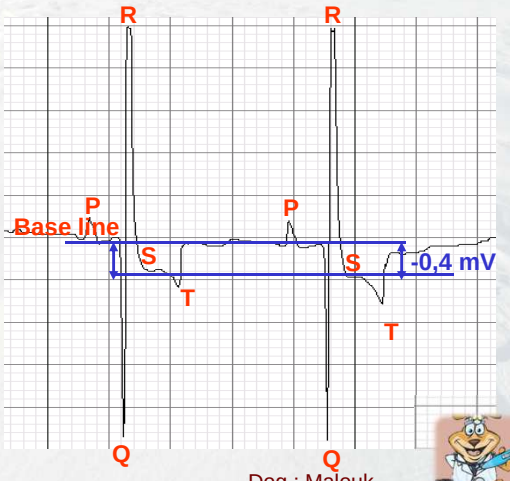
Baseline / ST segment

=> Witness of myocardiac hypoxia

-0,2 mV < NORMAL < + 0,15 mV

Hard work in altitude

Placebo group : myocardiac hypoxia

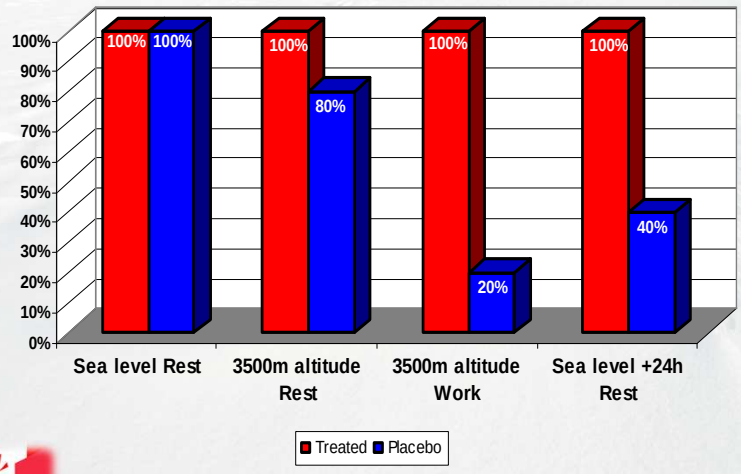


Dog : Malouk

Mont-Blanc 2004 : Results

ECG

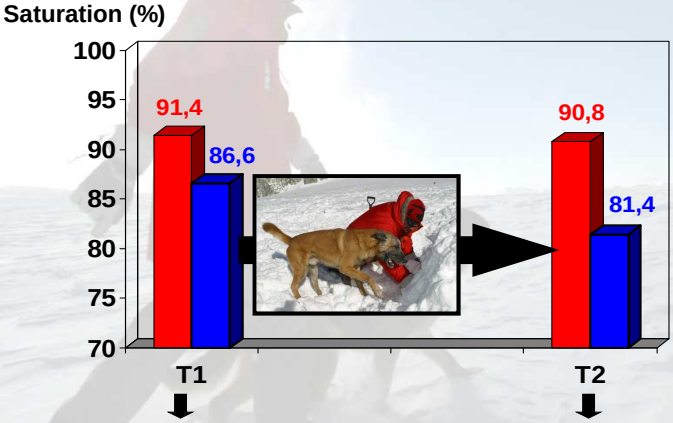
% of dogs without myocardiac hypoxia signs in altitude



Mont-Blanc 2004 : Scientific protocol

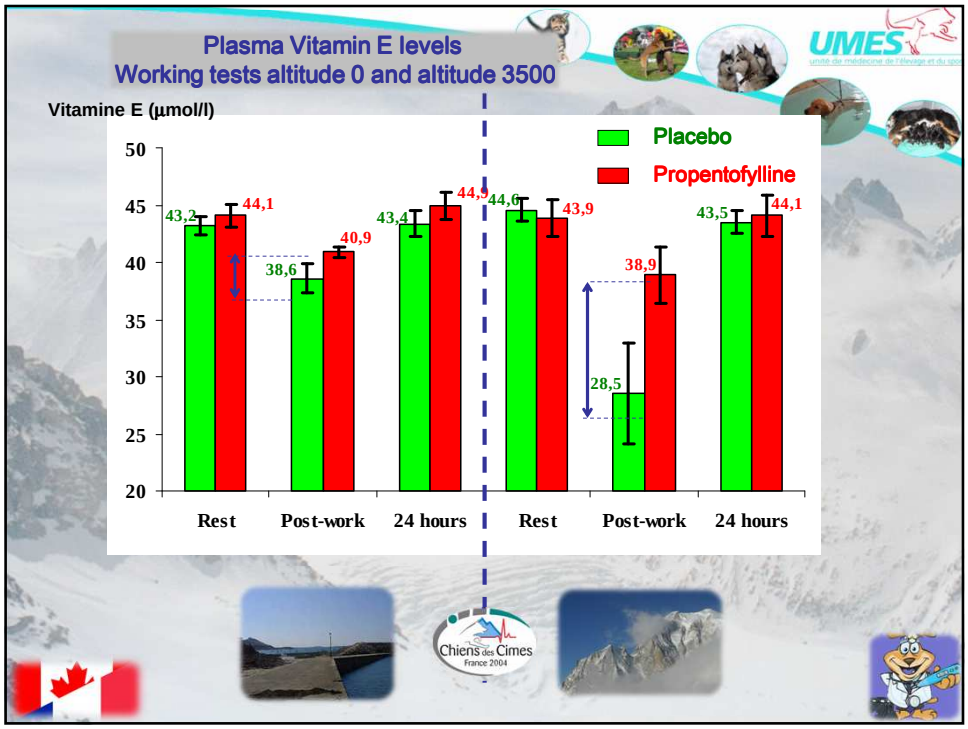
Results

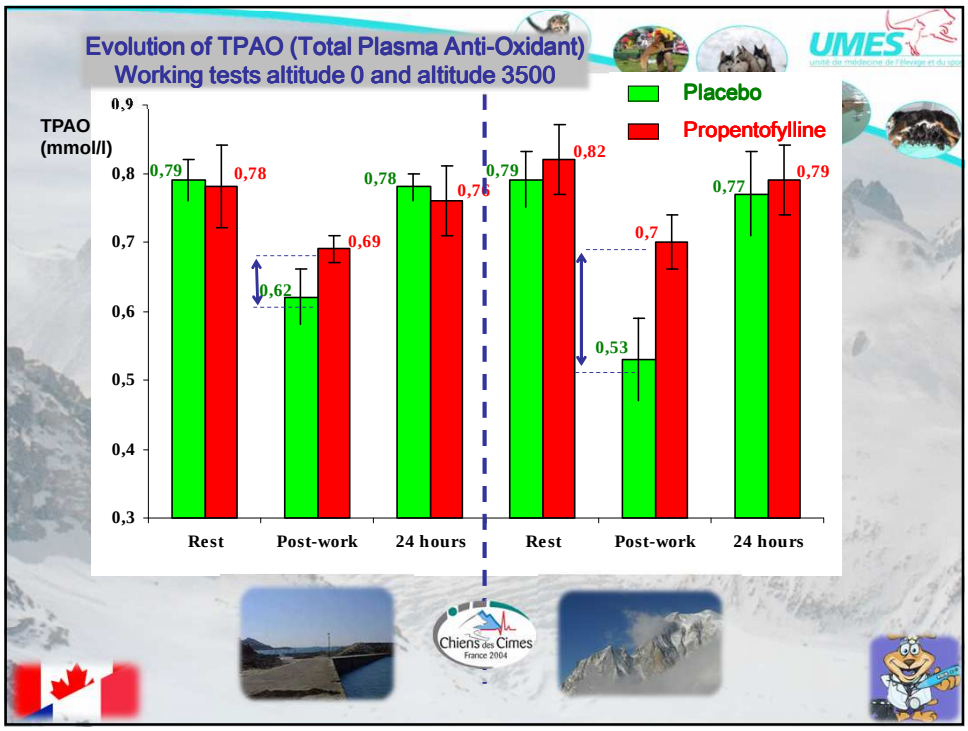
Oximetry

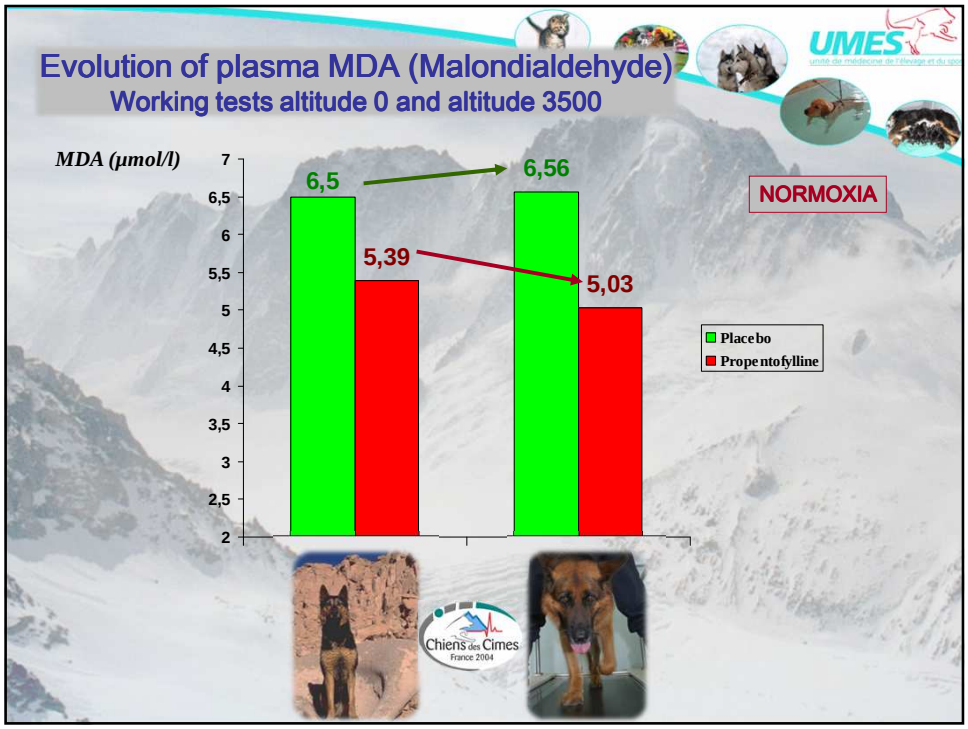


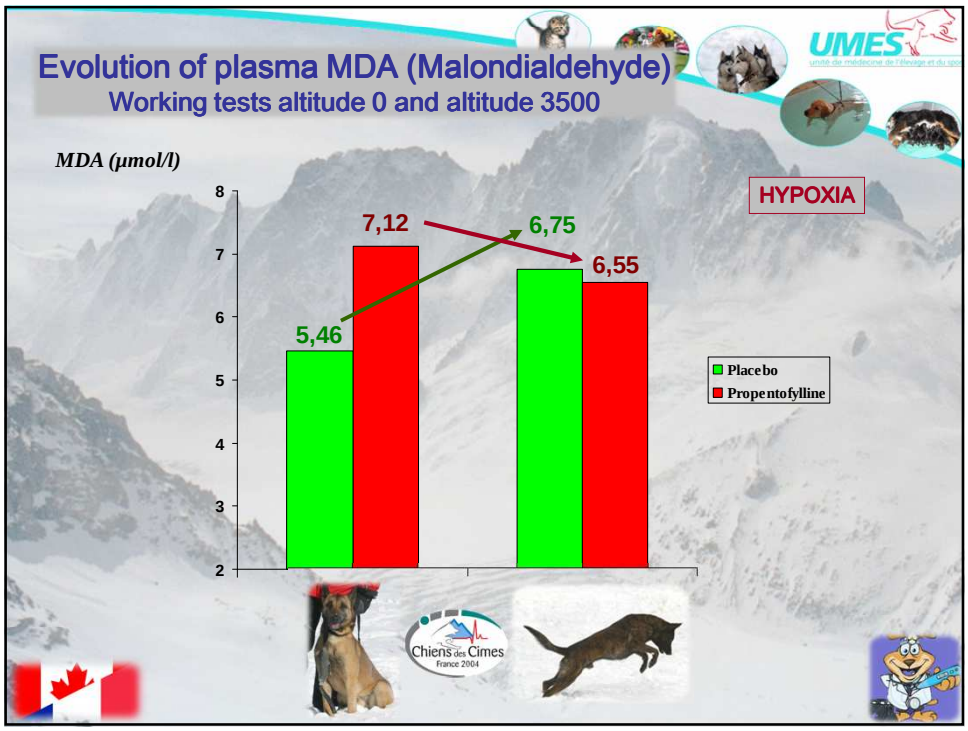
Best saturation in acute altitude of treated dogs

Best oxygenation post effort


Plasma Vitamin E levels
Working tests altitude 0 and altitude 3500
Vitamine E (µmol/l)
Placebo
Propentofylline
50
45
40
35
30
25
20
43,2
44,1
38,6
40,9
43,4
44,9
44,6
43,9
28,5
38,9
43,5
44,1
Rest
Post-work
24 hours
Rest
Post-work
24 hours
UMES
Chiens des Cimes
France 2004

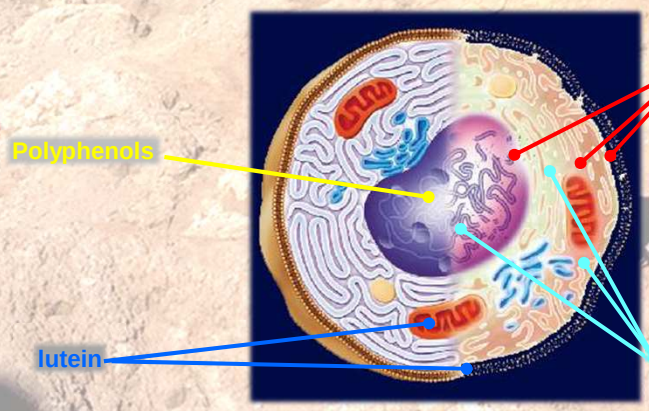

Evolution of TPAO (Total Plasma Anti-Oxidant)
Working tests altitude 0 and altitude 3500
TPAO
(mmol/l)
Placebo
Propentofylline
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,79
0,78
0,62
0,69
0,78
0,76
0,79
0,82
0,53
0,7
0,77
0,79
Rest
Post-work
24 hours
Rest
Post-work
24 hours
UMES
Chiens des Cimes
France 2004


Evolution of plasma MDA (Malondialdehyde)
Working tests altitude 0 and altitude 3500
MDA (µmol/l)
7
6,5
6
5,5
5
4,5
4
3,5
3
2,5
2
6,5
5,39
6,56
5,03
NORMOXIA
Placebo
Propentofylline
UMES
Chiens des Cimes
France 2004


Evolution of plasma MDA (Malondialdehyde)
Working tests altitude 0 and altitude 3500
MDA (µmol/l)
8
7
6
5
4
3
2
5,46
7,12
6,75
6,55
HYPOXIA
Placebo
Propentofylline
UMES
Chiens des Cimes
France 2004

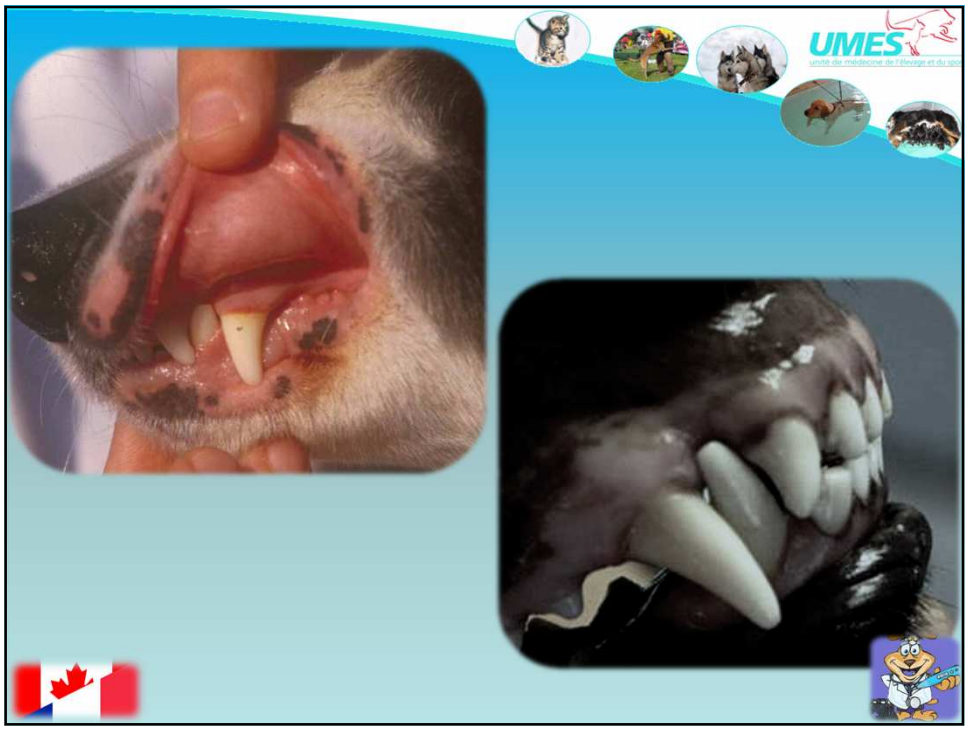
Nutritional prevention of oxidative stress

Global cellular antioxidation concept

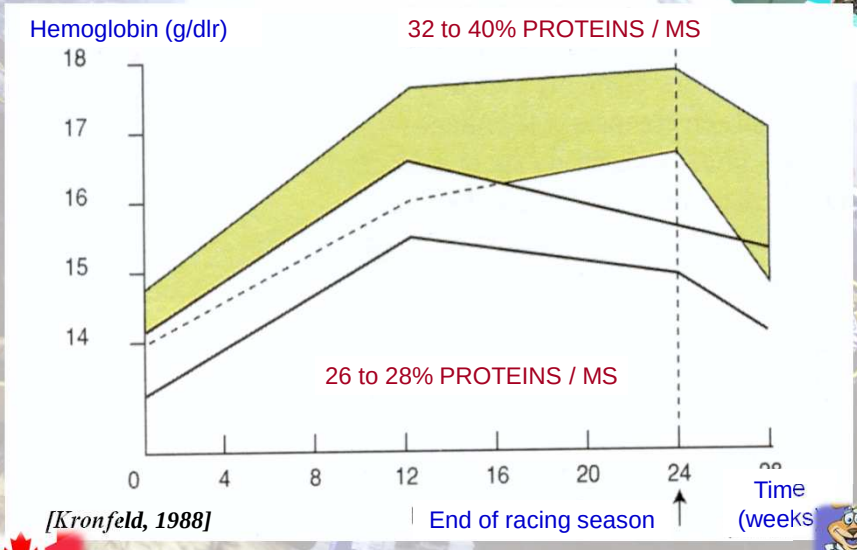


STRESS RELATED MEDICAL PROBLEMS IN WORKING DOGS

- **DIGESTIVE TRACT**
  - Gastric ulcers
  - Stress diarrhea
- **SPORT ANEMIA**
- **MUSCLE-TENDONS PROBLEMS**
- **STRESS FRACTURES**
- **CHRONIC JOINT PROBLEMS**
- **RESPIRATORY FRAGILITY**
  - Sensitivity to pneumania
  - « Ski-asthma » Like Syndrom
- **SUDDEN DEATH SYNDROM**



Beware of Proteins / Calories Ratio [PCR]



[Kronfeld, 1988]

REYNOLDS, 1999

Effect of protein intake during training on biochemical and performance variables in sled dogs

Proteins [% of ME] (% in a 4500 kcal ME/kg dry food)	18 (20)	23 (26)	29 (33)	35 (40)
Hematocrit (p100)	46 0.1	48 2	50 1	50 1
VO2max (ml/min/kg)	128 ± 80	174 ± 12	180 ± 12	174 ± 12
Muscle problems on dogs	8/8	1/8	0/8	0/8

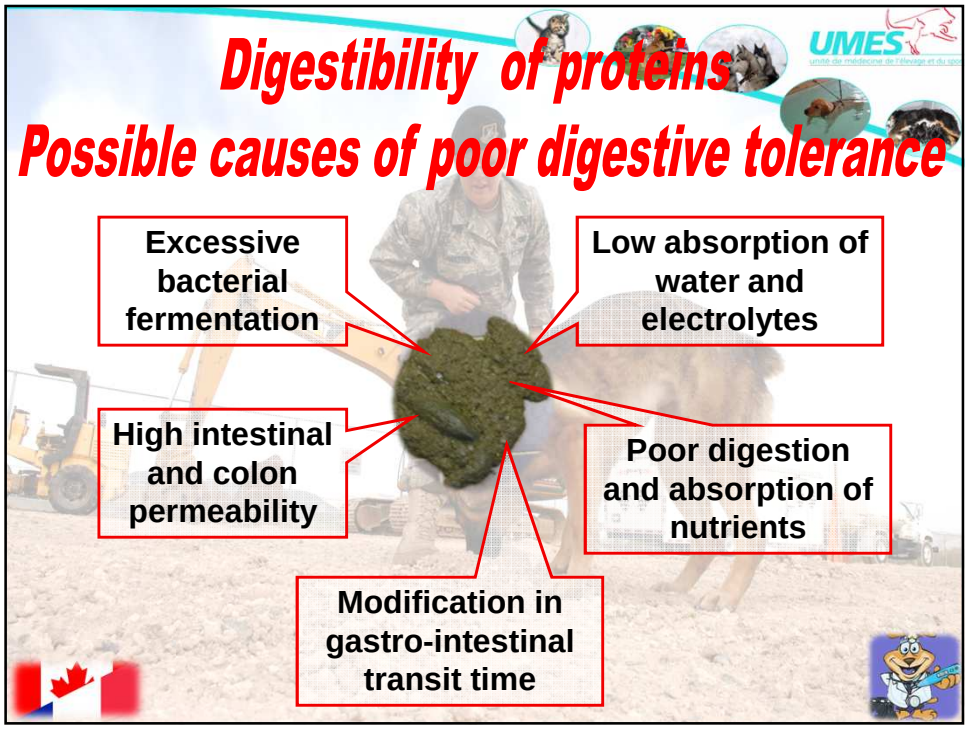
→ Increased structures turn over

→ Increased demand for essential amino-acid [peptidic hormones]

→ Long term stress impact

→ Glucogenic amino-acids

Digestibility of proteins
Possible causes of poor digestive tolerance



Biologic value of proteins

Balance of essential amino-acids

STRESS RELATED MEDICAL PROBLEMS IN WORKING DOGS

- **DIGESTIVE TRACT**
  - Gastric ulcers
  - Stress diarrhea
- **SPORT ANEMIA**
- **MUSCLE-TENDONS PROBLEMS**
- **STRESS FRACTURES**
- **CHRONIC JOINT PROBLEMS**
- **RESPIRATORY FRAGILITY**
  - Sensitivity to pneumania
  - « Ski-asthma » Like Syndrom
- **SUDDEN DEATH SYNDROM**

Pathology of muscles and tendons

Rhabdomyolysis consequence

Cramp

Inflammation

No Lesion

Muscle rupture

Lesion

Rupture

Tendon rupture

Precise diagnosis

Rupture