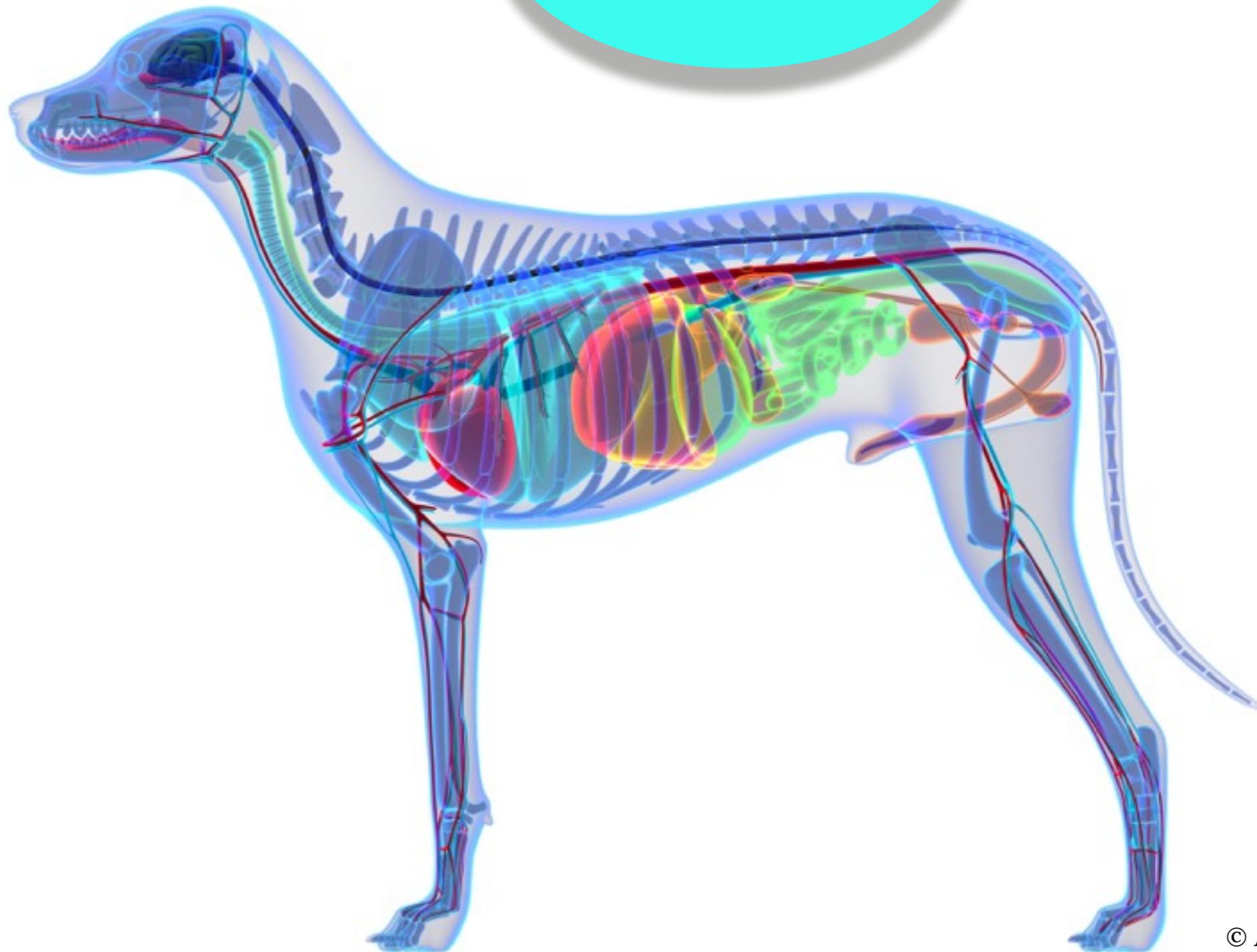


Reducing Stress



A dog with white and brown patches is lying on a sandy beach, looking out at the ocean. The background shows a clear blue sea with a line of red buoys in the distance. Three light blue circular text bubbles are overlaid on the image, containing text about stressors in dogs. The overall scene is peaceful and scenic.

Dogs have stressors every day - they cannot all be avoided

However, every stressor, even small ones, add up and add to the stress chemical load

The more small stressors we can reduce, as well as the large triggers, the less the overall stress load will be

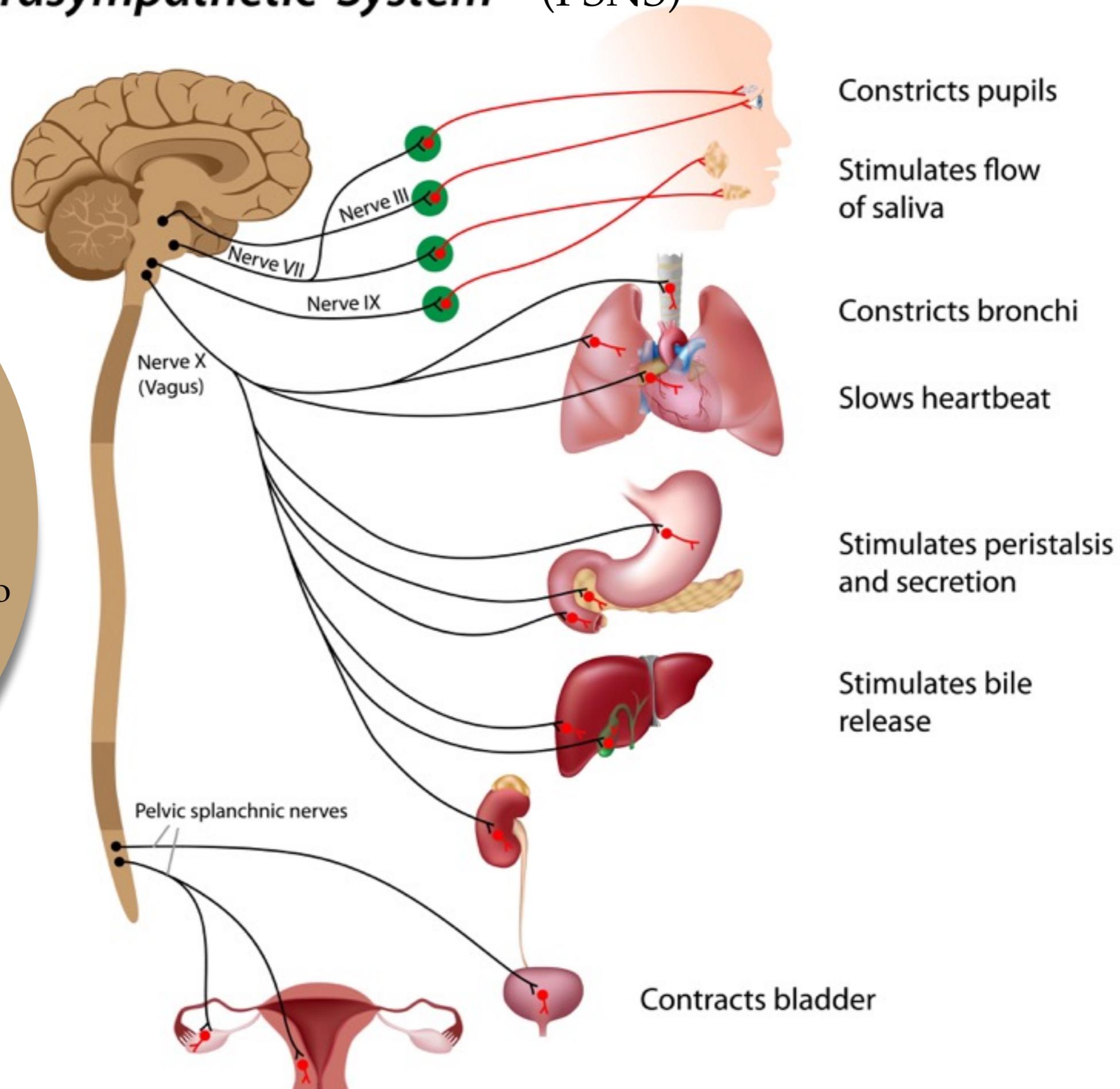
A dog with white and brown patches is lying on a sandy beach, looking out at the ocean. The water is a vibrant turquoise color, and there are red buoys visible in the distance. The sky is a pale blue. A light blue circle is overlaid on the image, containing the text.

Give your dog a
holiday

Parasympathetic System (PSNS)

“Rest and Digest
and Heal”

To reduce stress hormones, we want to activate the **Para**sympathetic Nervous system (the opposite to the SNS) to activate “rest and digest”



When an animal is traumatised, nothing feels safe

So the first things to offer a traumatised or stressed dog are.....

Safety and security

Comfort and company

Rest and sleep

Peace and quiet

Calm activities

Sleep



At night, the body repairs itself. The whole metabolism changes; it slows way down. Our temperature drops. Our heart rate and breathing slow. Our digestion slows. All of this happens so that damaged cells can break down and reform themselves

While we sleep, we build neural pathways. Our liver detoxifies our blood. Our immune system replenishes. Our body heals, on a cellular level, from the work of the day.
Gersh, M.D. Felice. PCOS SOS



Sleep is the
brain's way of
dealing with
being awake

Adequate
sleep is vital to a
dog's health and
wellbeing

High cortisol
levels = no sleep

Dogs need 14-18
hours sleep a day to
stay healthy
(puppies 20 hrs)

A close-up photograph of a brown dog with floppy ears, likely a Weimaraner, sleeping peacefully on a patterned blanket. The dog's head is resting on the blanket, and its eyes are closed. The background is softly blurred, showing more of the patterned fabric.

Dogs need appropriate rest after excitement or exercise

The same reason that children are told to have “quiet time” before bed - for their adrenaline and cortisol to have time to reduce so they can sleep. We cannot sleep when excited

During sleep brain cells grow and develop. Memories are consolidated as dogs process things that happen during the day



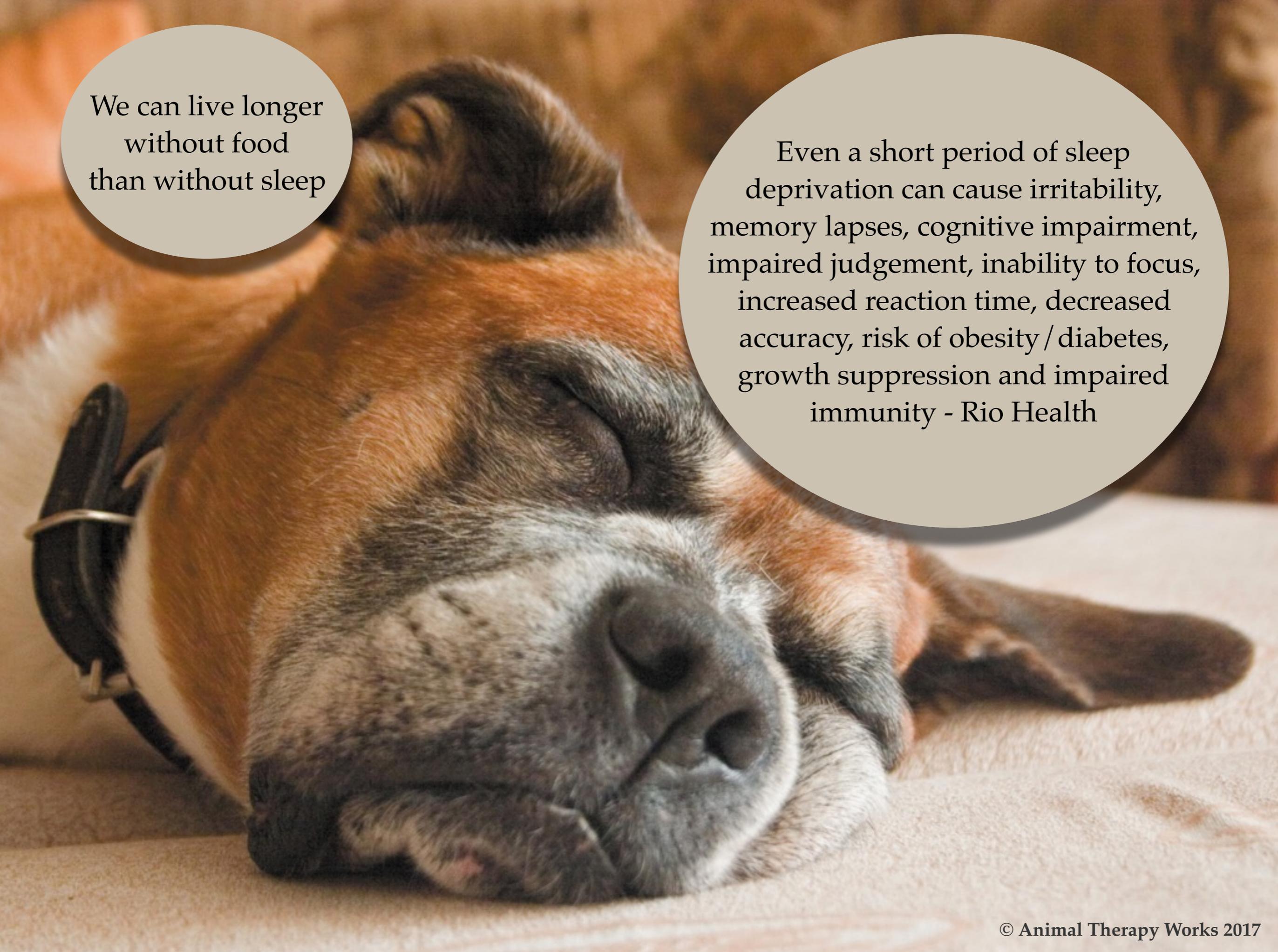
Sleep gives the brain
the chance to get on top of
its paperwork, chuckle over
your day's events, and enjoy
some quality 'me' time
Anil Seth



Dogs sleep around 66% of the time so it is important to give them a choice of comfortable sleeping places at different heights, in quiet locations

Give them room to stretch out, feel safe, secure and comfortable

Dogs need to be able to stretch out fully in order to go into restorative REM sleep (important if they are made to sleep in a cage)



We can live longer
without food
than without sleep

Even a short period of sleep deprivation can cause irritability, memory lapses, cognitive impairment, impaired judgement, inability to focus, increased reaction time, decreased accuracy, risk of obesity / diabetes, growth suppression and impaired immunity - Rio Health



Sleep deprivation causes symptoms not dissimilar to those seen in ADHD. There is a direct effect on brain and nerve function

Melatonin, the hormone produced by the pineal gland primarily in darkness, plays a very important role in sleep and health. As we age we may produce less melatonin and this may account for sleep problems in the elderly

Rio Health

Melatonin is also one of the body's most important antioxidants and has particular ability to protect the nerves and brain

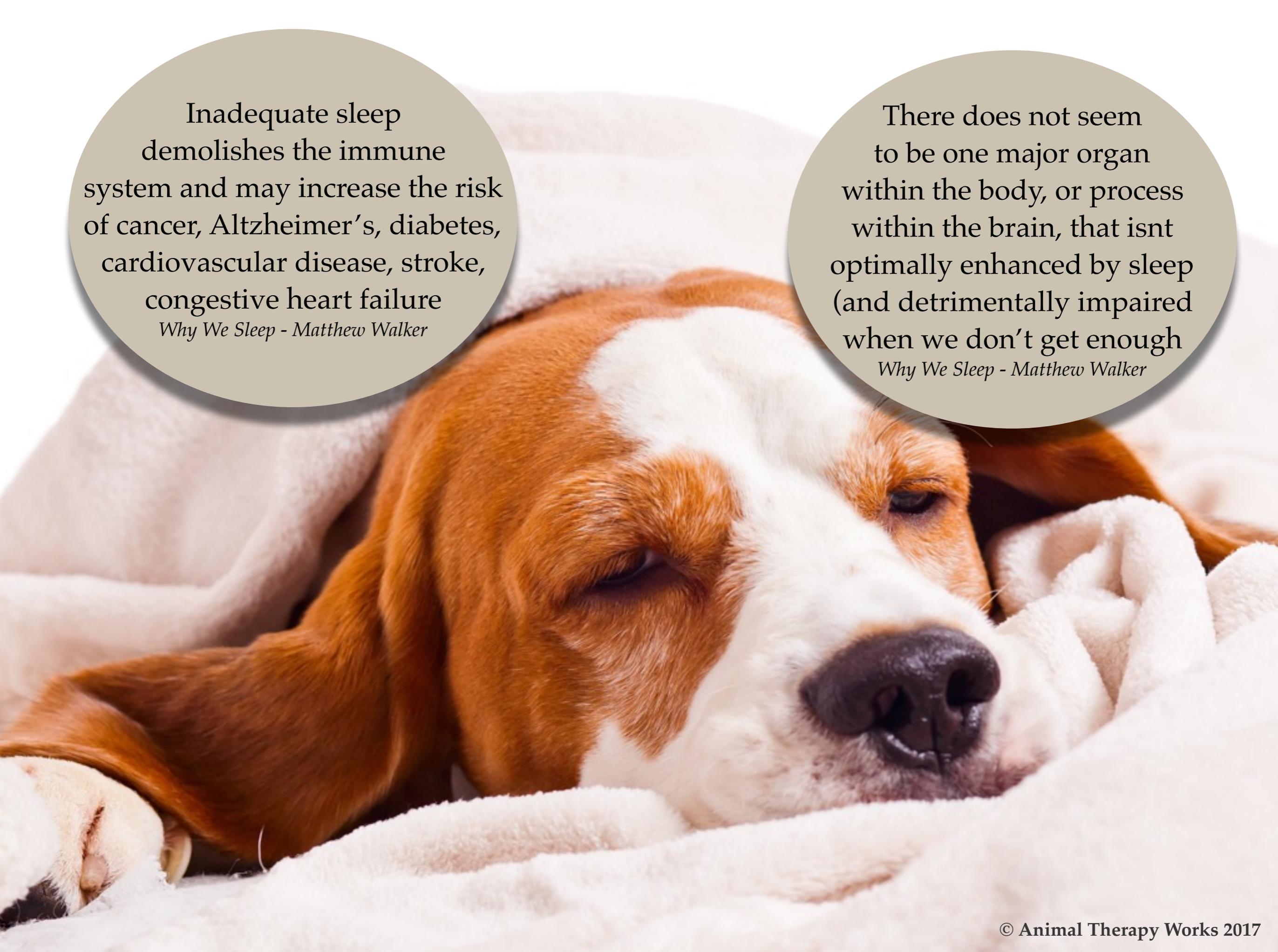
Rio Health

A photograph of three small dogs sleeping on a white surface. On the left is a Yorkshire Terrier with long, golden-brown hair. In the middle is a dog with shaggy, grey and black fur. On the right is a dog with dark, curly fur. The background is a soft, out-of-focus brown.

Cortisol regulates sleep. It should fluctuate throughout the day. It is low at night and high in the morning to make us wake up and eat

A dog's sleep will be impaired if levels of cortisol are high.
High cortisol = no sleep

If stress becomes excessive, the adrenals stop producing cortisol and sleep is disrupted further. Low cortisol can result in fatigue, no get up and go.



Inadequate sleep
demolishes the immune
system and may increase the risk
of cancer, Alzheimer's, diabetes,
cardiovascular disease, stroke,
congestive heart failure

Why We Sleep - Matthew Walker

There does not seem
to be one major organ
within the body, or process
within the brain, that isn't
optimally enhanced by sleep
(and detrimentally impaired
when we don't get enough

Why We Sleep - Matthew Walker



At night, genes related to energy metabolism, DNA repair and cell growth are enacted, while during the day, bacteria produce molecules that consolidate their own colonization of the gut.

https://www.gutmicrobiotaforhealth.com/en/the-gut-microbiota-clock-the-close-connection-between-gut-microbiota-dietary-patterns-and-the-circadian-rhythm/?utm_source=Gut+Microbiota+For+Health+-+NW+%28EN%29&utm_campaign=7ad7add82d-EMAIL_CAMPAIGN_2018_07_31_12_14_COPY_01&utm_medium=email&utm_term=0_36413f3333-7ad7add82d-128328397

A photograph of two small dogs, a Yorkshire Terrier and a Shetland Sheepdog, sleeping peacefully on a white blanket. The Yorkshire Terrier is on the left, and the Shetland Sheepdog is on the right. The background is softly blurred, showing a wooden surface.

Restricted sleep
affects hormone levels
in the brain that can lead to
depressive thoughts and
behavioral changes

<https://www.healthyandnaturalworld.com/sleep-deprivation/>

Serotonin is released
during REM sleep, and a
lack of serotonin is often
connected to depression
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4318605/>

A severe sleep
deficiency can cause
obesity which can also
impact on testosterone
hormone levels



The purpose of sleep however still remains mysterious and scientists are still making discoveries

A study found that metabolic waste products of neural activity were cleared out of the sleeping brain at a faster rate than during the awake state

The restorative function of sleep may be a consequence of the enhanced removal of potentially neurotoxic waste products that accumulate in the awake CNS

<https://science.sciencemag.org/content/342/6156/373>



Disturbance of sleep can profoundly affect blood sugar levels which can damage nerves, organs and blood vessels

A dog **cannot** get quality sleep when its stress chemicals are **high**

Sleep and the brain video



A photograph of a dark-colored dog lying in a field of tall, green grass. The dog is positioned in the center-right of the frame, facing away from the camera. The grass is dense and reaches up to the dog's back. Overlaid on the image are five light green circular text bubbles containing text about brain health and cognitive stimulation for dogs.

Healthy Brain

If the structure of the brain changes depending on what occurs in our dogs lives, their experiences and environment

We need to find strategies throughout their lives to help them function better, and to improve or maintain cognition

Just as we take care of the body, we need to take care of the brain through mental stimulation and new experiences

Nosework
Social walks
NEW places
NEW experiences
Choices
Variety
Silence

Choices

We give
dogs few
choices in their
lives

Giving a
dog back some
choices, will make
them much more
happy and
relaxed



Choices

Rendering an animal **helpless** (no choices) is one of the most rapid ways to deplete the **adrenals**

Let the dog be free to **choose** to walk, trot or gallop, climb, stop, sniff, sit, lie down or simply watch the view



Be Still

Allow them be still.
Teach them to be still
Teach yourself to be still



A fluffy brown dog, possibly a Komondor or similar breed, stands in a snowy mountain landscape. The dog is looking towards the left of the frame. The background features snow-covered evergreen trees and a hazy sky. Three light blue oval callouts are overlaid on the image, containing text about the benefits of silence for animals.

Silence

Be **silent**
Stop commanding
Give no distractions

Scientists
discovered that with two
hours of silence per day,
animals developed **new**
functioning neurons in the
hippocampus (memory
and learning)



Whatever you do
with your dog, do it
slightly **different**
every time

Variety is the
spice of life, and
good for the
brain



Senses

Dogs
are noses on
legs, they “see” the
world differently
to us

Let the dog use its
natural senses to stimulate
the brain - hearing, smell,
eyesight, taste, to assess his
environment without the
distraction of your voice

Calm Sessions

A great way
to help them to
understand the world
and to cope, and to
promote a healthy
brain

Sit and relax
quietly on a walk,
or in different
situations, and let
your dog watch the
world go by



It is important
to give dogs a chance
to rest during a walk
or training

“Phew! I
thought she’d
never stop!”



Curiosity

Let the dog be curious. A curious dog is a healthy dog. Curiosity is healthy for brain development



Slow Walking

A photograph of a dog standing in a field of tall grass. The dog is looking to the left. The background is a dense forest. The image is overlaid with several light green circular text bubbles containing text about slow walking.

One of the best ways to calm an anxious dog is to reduce walking to a very slow pace

Walking slowly allows a dog to develop good healthy muscles and a healthy brain by sniffing

Walk in a polite curve when approaching other dogs or people - as dogs do naturally

Walking slowly reduces adrenaline and cortisol

Dog Pulse Project

What happens to the dogs heart rate when a stranger walk in a curve towards the dog?

Turid Rugaas describes the calming signal “walking in a curve when you meet a dog”. Dogs do this when they meet to show that they are friendly and want to avoid conflict

By measuring the dog’s pulse (as an indicator of physiological response) Agnes wanted to see if the calming signal “Walk in a curve” have an effect

It did!

Dog Pulse Project

What happens to the dogs heart rate when a stranger walk
in a curve towards the dog?

Agnes Vælidalo - www.dogpulse.org

Dog Pulse Project

What happens to the dogs heart rate when a stranger walk
in a curve towards the dog?

First video - still to come from
Agnes

Agnes Vælidalo - www.dogpulse.org



Slow walking helps to repair the body

By walking a dog slowly you may be able to identify any physical issues

Given the **choice**
what activities do
dogs **choose** to do?



A brown and black dog is lying on a paved surface, resting. The dog's head is down, and its body is stretched out. The background is blurred, showing people in a public setting.

When given a **choice** dogs to not physically exhaust themselves

Studies show that street dogs do not race about chasing things

They know the value of **rest**

They spend a lot of time resting to conserve energy



No dog **needs** a lot of exercise or training

Saving energy is one of dogs **inborn** skills

We have been conditioned by the media and advertising to overdo things with our dogs, rather than just dogs **be** a dog

Good energy levels preserves **nutrients** and promotes **healing**

Magnesium, Zinc, B Vitamins and Vitamin C can be rapidly used up with stress

A photograph of four dogs resting on a concrete ledge in front of a black metal lattice gate. From left to right: a black and tan dog, a brown dog, a light brown dog, and a reddish-brown dog. The gate is made of black metal bars forming a diamond pattern. The background shows a building with a brown wall and a window with a white frame.

Street dog research showed that dogs spend around half of their time sleeping/resting and half foraging, sniffing, standing, walking

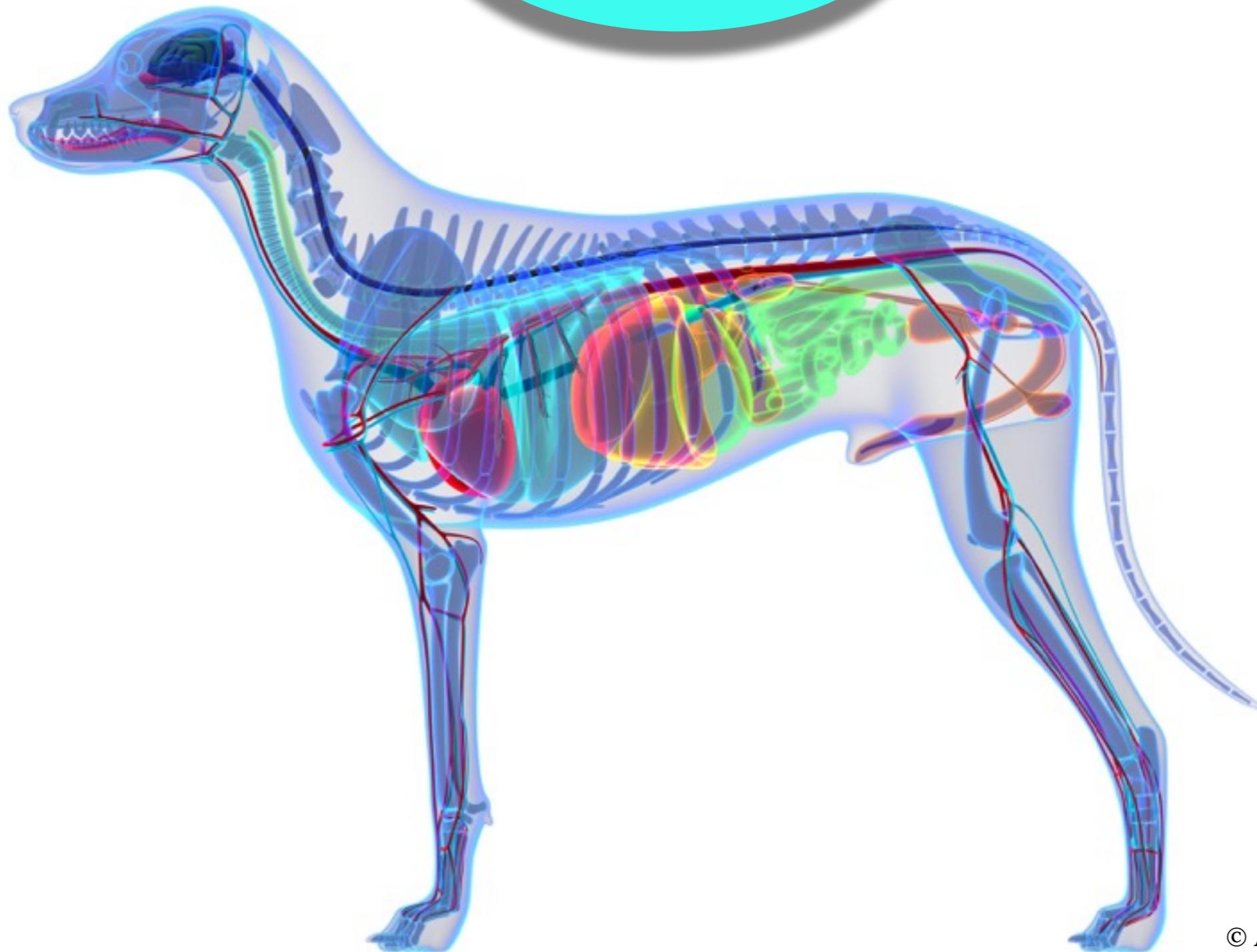
None were observed catching prey (rats etc), only foraging for food

Majumder S. S, Chatterjee A & Bhadra A

(2014). A dog's day with humans-time activity budget of free-ranging dogs in India.

Current Sciencs 106(6), 874

Use the Nose



A close-up photograph of a dog's nose and muzzle. The nose is dark and textured, with two nostrils visible. The fur around the nose is grey and shaggy. The background is blurred, showing more of the dog's fur.

“I walk him for miles
but he is still not tired”

Dogs are born to sniff,
and forage using their noses
and their brains

Just a few
minutes of nose work
can be very tiring and
mentally stimulating

Nose work
and foraging will
keep your dog's brain
healthy and keep
him calm

“Our nose is our ultimate survival tool”

“Pee Mails are our Newspapers”

“They tell us if there are any dangerous dudes or dishy dames in the area in the area”



“Stopping us from sniffing, is like giving us a blindfold ”

“Sniffing helps us to feel safe and keep calm”



A beagle dog with white, black, and brown patches is shown in profile, sniffing the ground in a lush green field. The dog is wearing a black collar with white studs. The background is a clear blue sky with some bare tree branches. A light blue circular graphic contains text on the right side of the image.

Like their
ancestors, all dogs
need active sniffing and
enriched environments
each day for good mental
health, stimulation and
calm behaviour

A black and white speckled dog is shown in profile, sniffing a bush in a grassy field. The dog has a black collar and is looking towards the right. The background is a blurred green field with some trees.

Dogs leave messages through their urine, your dog can find out the latest news by investigating it

A dog's world is smell. Dogs "see" with their noses

Always let your dog sniff for as long as he wants - it is far more beneficial to them than a long walk or throwing a ball

Just like our fingerprints, dogs have unique nose prints

Dogs can smell our fear and anxiety chemicals such as adrenaline, changes in heart rate or blood flow, blood sugar levels

A close-up photograph of a dog's nose, showing the intricate, cracked texture of the skin. The two nostrils are prominent, and the surrounding fur is visible. A yellow callout box with a pointer is positioned to the left of the nostrils, pointing to the side of the nostril.

Slits on the side of the nostrils are for exhalation only so that the nostrils can focus on taking in scent

A busy street scene in a market. In the foreground, a brown dog is sniffing a pile of trash and straw on the ground. To the left, a man in a white shirt stands next to a wooden cart loaded with fish. Other people and rickshaws are visible in the background, creating a bustling atmosphere. A yellow oval with text is overlaid on the image.

Dogs can catch scents from a mile away. Each nostril draws separate samples of odour, so sniffing in multiple directions at once allows dogs to understand their environment

A close-up photograph of a black and white dog, possibly a Shetland Sheepdog, sniffing the grass. The dog's head is in the center, with its nose touching the blades of grass. The background is a soft-focus green field. A light brown circular text box is overlaid on the left side of the image.

Dogs circle when a
scent breaks up.
Sniffing the edge of the
odour gives context and
direction. A scent
“picture”

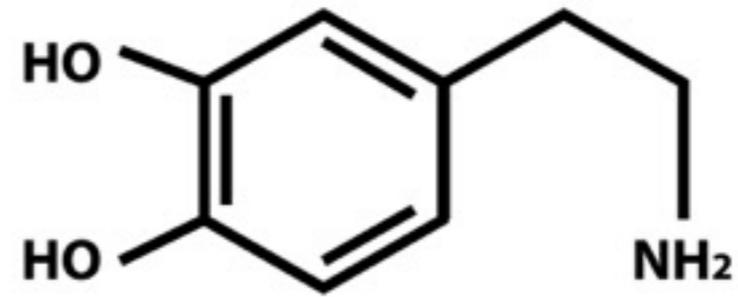
A black and white dog with a red collar is sniffing a large pile of dark, wet manure. The dog is positioned at the bottom center of the frame. The manure pile is the central focus, extending from the foreground into the background. In the background, there is a green field and a line of trees under a clear sky. A yellow oval with black text is overlaid on the right side of the image.

Dogs' nostrils can work independently from each other. The right detects fear, aggression and escape behaviour (novelty), and the left detects food or another dog (calm, familiar)

Feelings of pleasure, also addiction, movement and motivation. Dogs repeat behaviours that lead to dopamine release

Dopamine

HORMONE PLEASURE



Reduced hormone levels

FATIGUE
DEPRESSION
LOSS OF INTEREST IN LIFE



Normal



Increased hormone levels

SCHIZOPHRENIA

Dopamine is an important reward neurotransmitter associated with memory, motivation, clear thought, good feelings and motor skills, It is triggered by a positive environmental circumstance

Sniffing and foraging produces the feel-good neurotransmitter, dopamine - the brain's reward and motivation centre

Dopamine

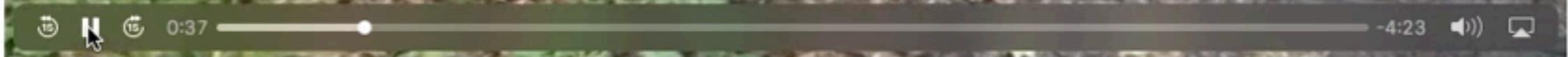
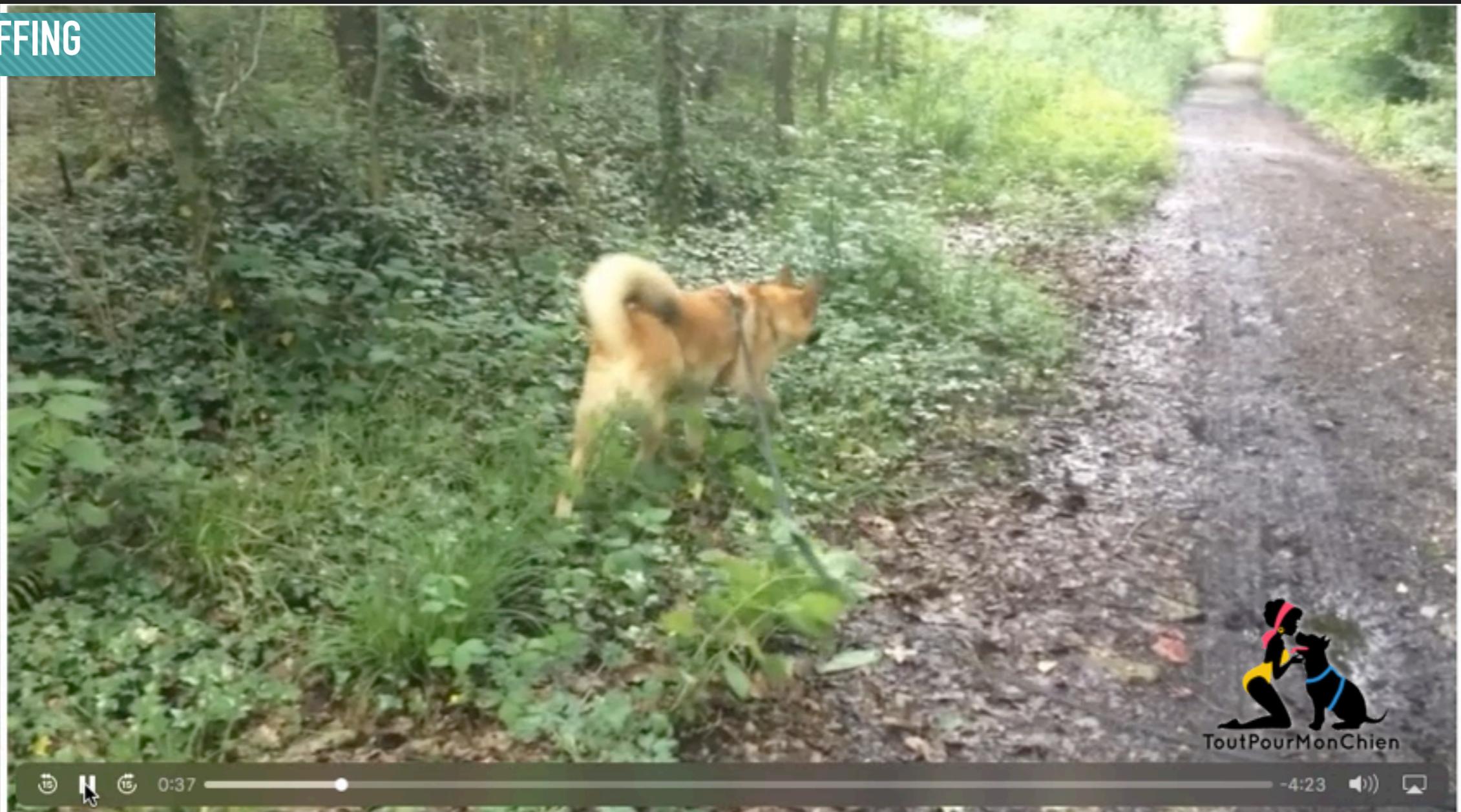
Foraging is a hard-wired inherited behaviour for all dogs for assessing their environment to feel safe and to find food

**Regular
TREAT
SEARCHES
in the garden**

Dopamine

Video from Aurelian & Christina showing dogs sniffing and
heart monitor live graph

SNIFFING



Pulse data



Foraging is a hard-wired inherited behaviour for all dogs for assessing their environment to feel safe and to find food

**Regular
TREAT
SEARCHES
in the garden**



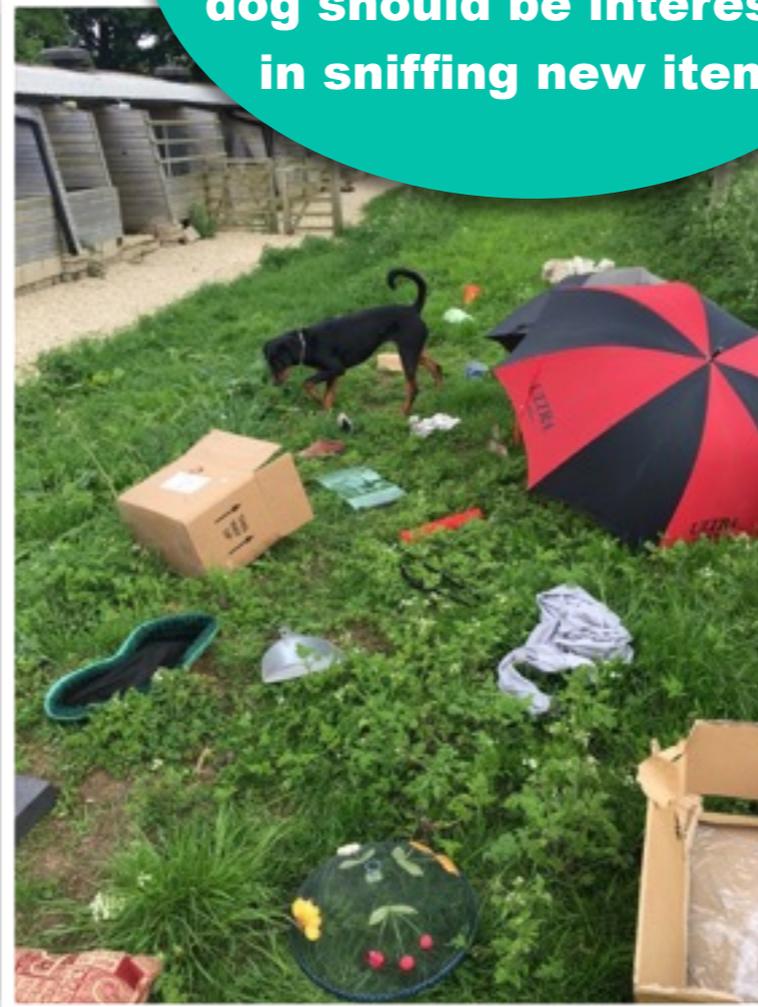


TREAT SEARCHES up trees and branches



ENRICHED ENVIRONMENT
Lots of interesting objects to explore - a well adjusted dog should be interested in sniffing new items

SNUFFLE MAT searches are great for dogs left on their own - make your own or buy



SCENT PUZZLES





Olfaction
(sniffing) plays a
pivotal role in social
relations

They can tell
the emotional or
reproductive status
of another dog on
a walk

Bottom
sniffing is a
useful greeting for
dogs to find out
about each
other

Dog Pulse Project

What happens to the dogs heart rate when a stranger walk in a curve towards the dog?

Turid Rugaas describes the calming signal “walking in a curve when you meet a dog”. Dogs do this when they meet to show that they are friendly and want to avoid conflict

By measuring the dog’s pulse (as an indicator of physiological response) Agnes wanted to see if the calming signal “Walk in a curve” have an effect

It did!

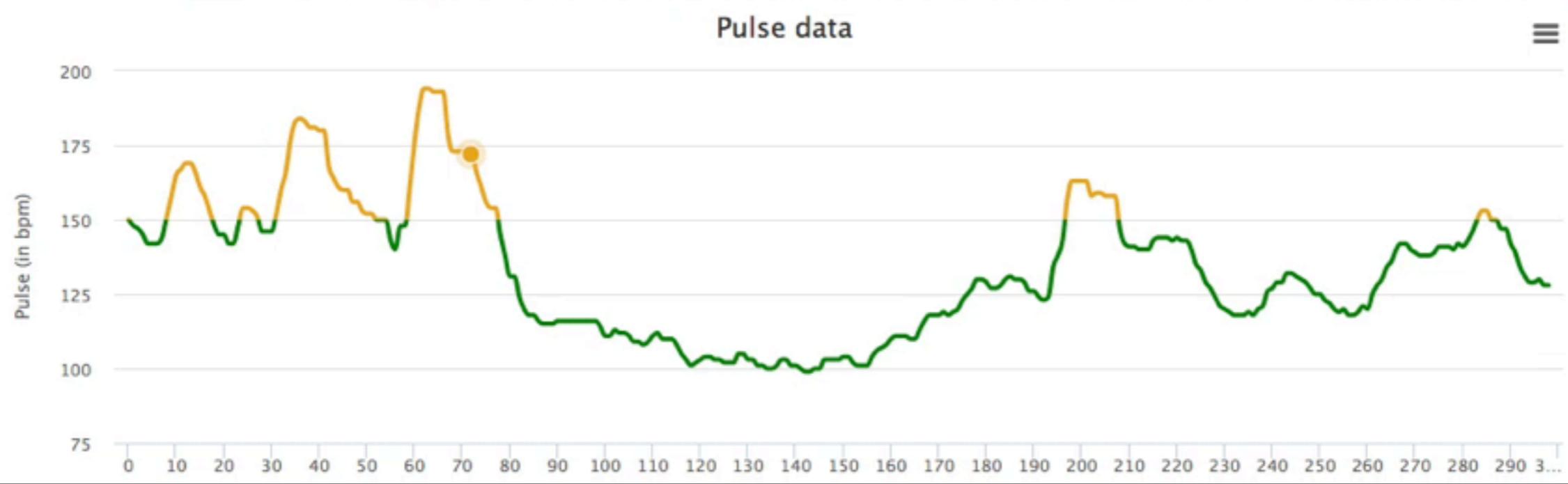
Dog Pulse Project

What happens to the dogs heart rate when a stranger walk
in a curve towards the dog?

Agnes Vælidalo - www.dogpulse.org

Video from Aurelian & Christina showing dogs eating grass
and heart monitor live graph

EATING GRASS



Anne Lill Kvam

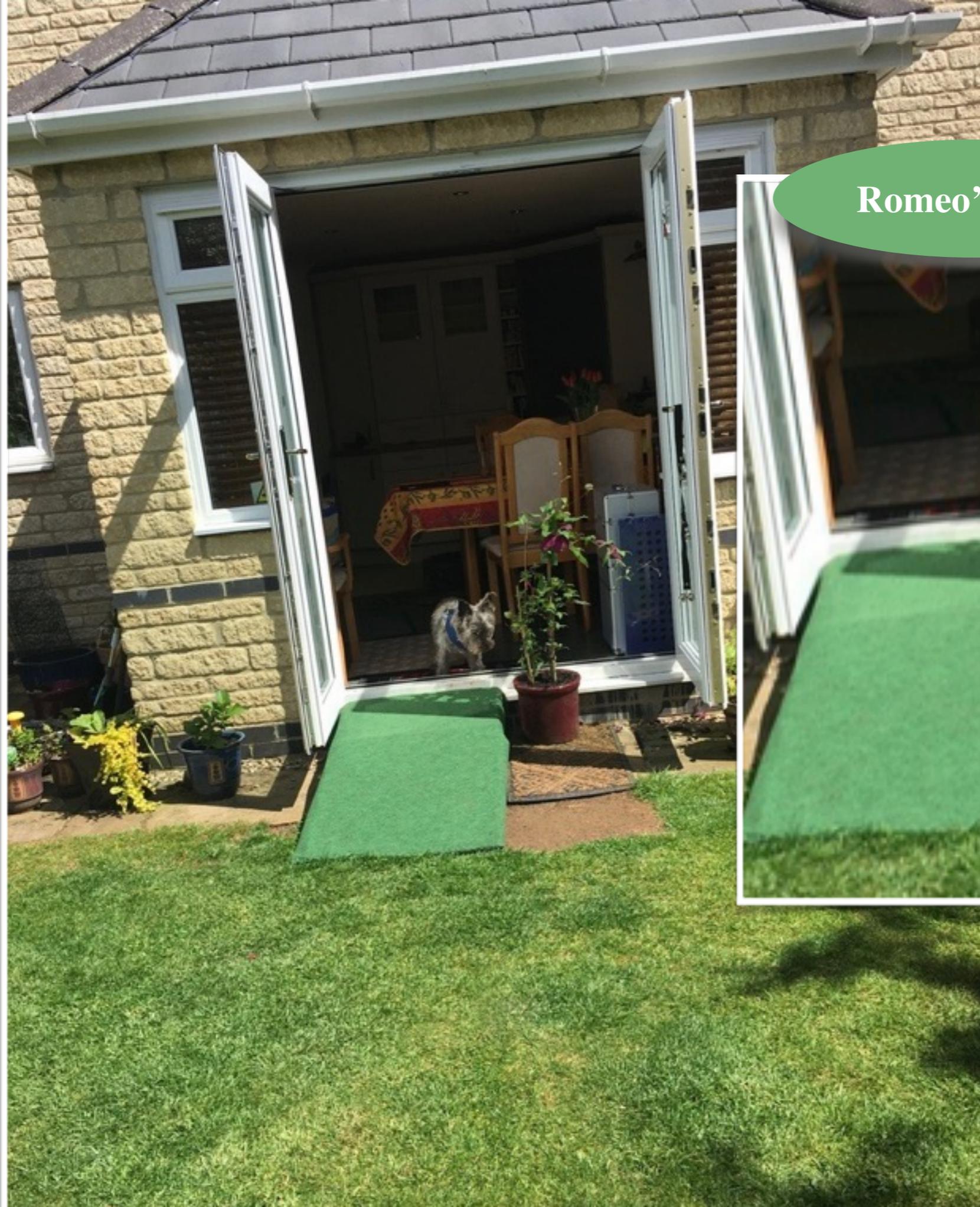
The Canine Kingdom of Scent

Fun activities using your dog's natural instincts



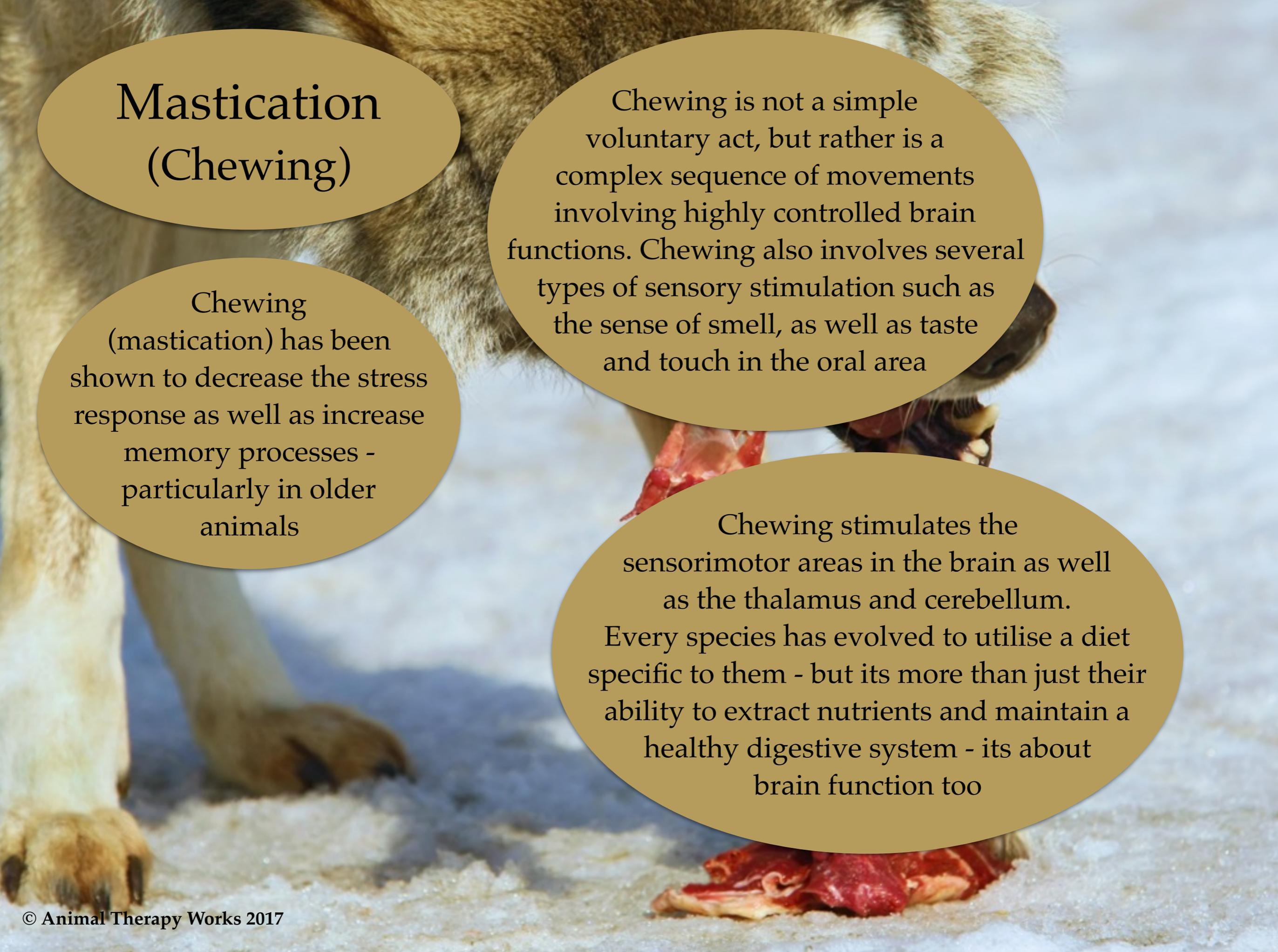
A Dogwise® Training Manual





Romeo's Story





Mastication (Chewing)

Chewing
(mastication) has been
shown to decrease the stress
response as well as increase
memory processes -
particularly in older
animals

Chewing is not a simple
voluntary act, but rather is a
complex sequence of movements
involving highly controlled brain
functions. Chewing also involves several
types of sensory stimulation such as
the sense of smell, as well as taste
and touch in the oral area

Chewing stimulates the
sensorimotor areas in the brain as well
as the thalamus and cerebellum.
Every species has evolved to utilise a diet
specific to them - but its more than just their
ability to extract nutrients and maintain a
healthy digestive system - its about
brain function too



Mastication (Chewing)

It is generally thought that the act of mastication, even without calorie intake, has beneficial psychosomatic effects and increases brain function

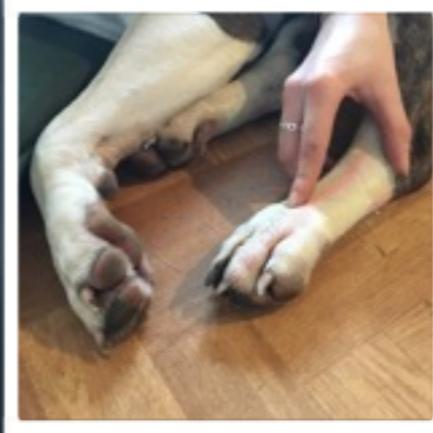
In humans, chewing gum is thought to alter brain function, mood, and is associated with a lower arousal status and relaxation - as measured by brain electricity

Association between Mastication, the Hippocampus, and the HPA Axis: A Comprehensive Review.
<https://www.ncbi.nlm.nih.gov/pubmed/28771175>

Association between Mastication, the Hippocampus, and the HPA Axis: A Comprehensive Review.
<https://www.ncbi.nlm.nih.gov/pubmed/12407087>

Effect on electroencephalogram of chewing flavoured gum
<https://onlinelibrary.wiley.com/doi/full/10.1046/j.1440-1819.2000.00772.x>

Massage
Acupoint Therapy
Herbal Choices
Photo-Therapy

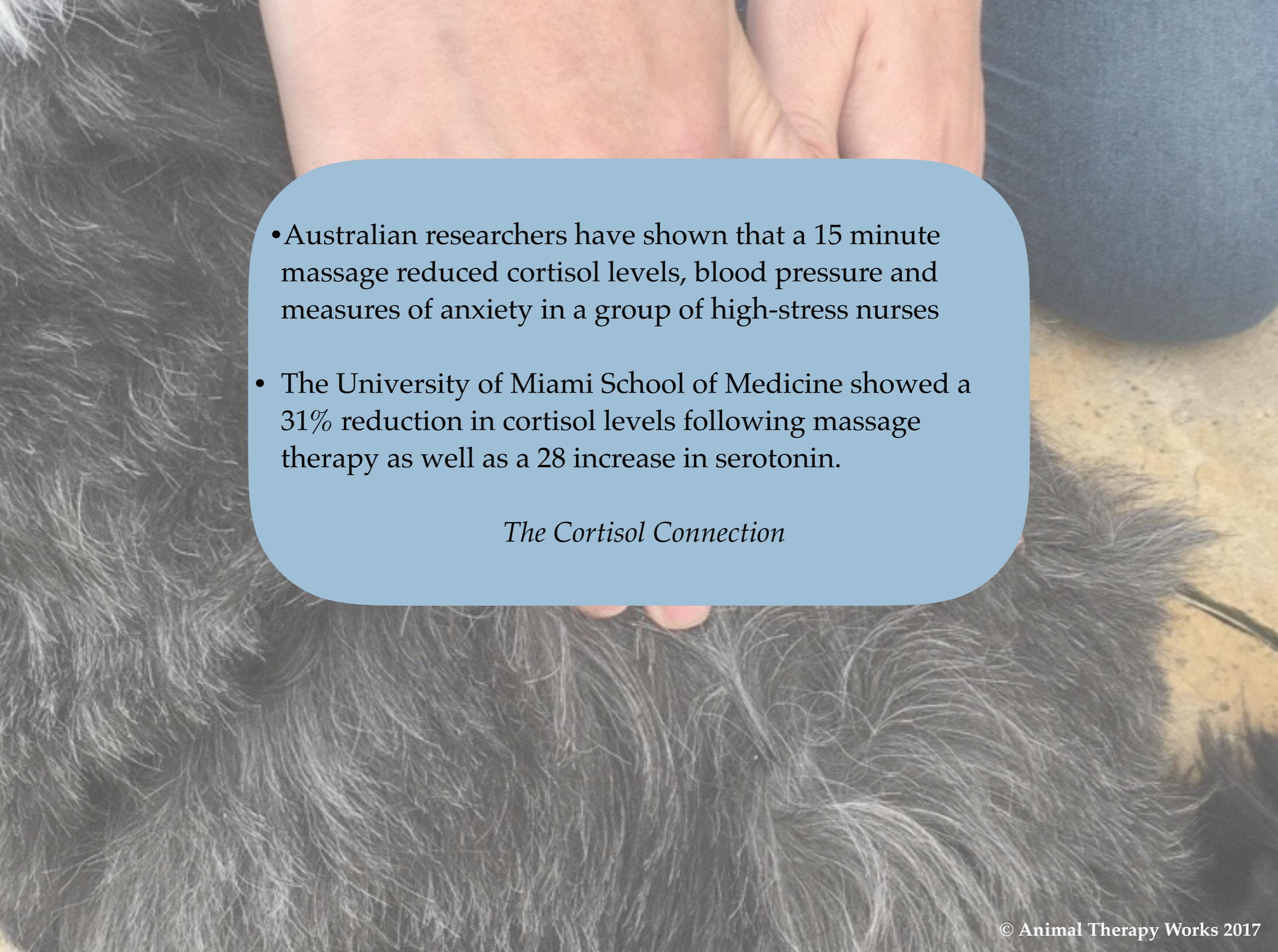


*Serotonin and dopamine are increased
Cortisol is decreased
Int J Neurosci, 2005*

Have been shown to promote:-

- Release endorphins, helping to reduce pain
- Release muscle spasm
- Remove toxins
- Promote good blood flow
- Enhance mental clarity and focus
- Mentally relaxing and comforting
- Can help to calm nervous dogs
- Increase blood supply to injuries
- Build the body's immune system
- Release natural hormones to reduce swelling



- 
- Australian researchers have shown that a 15 minute massage reduced cortisol levels, blood pressure and measures of anxiety in a group of high-stress nurses
 - The University of Miami School of Medicine showed a 31% reduction in cortisol levels following massage therapy as well as a 28 increase in serotonin.

The Cortisol Connection

The background of the entire image is a soft, warm sunset or sunrise sky. In the lower half, the silhouettes of a woman and a dog are shown in profile, facing each other. The woman is on the right, and the dog is on the left. The dog's head is turned towards the woman, and her hand is gently touching the dog's face. Two large, semi-transparent brown circles are overlaid on the upper half of the image, containing text.

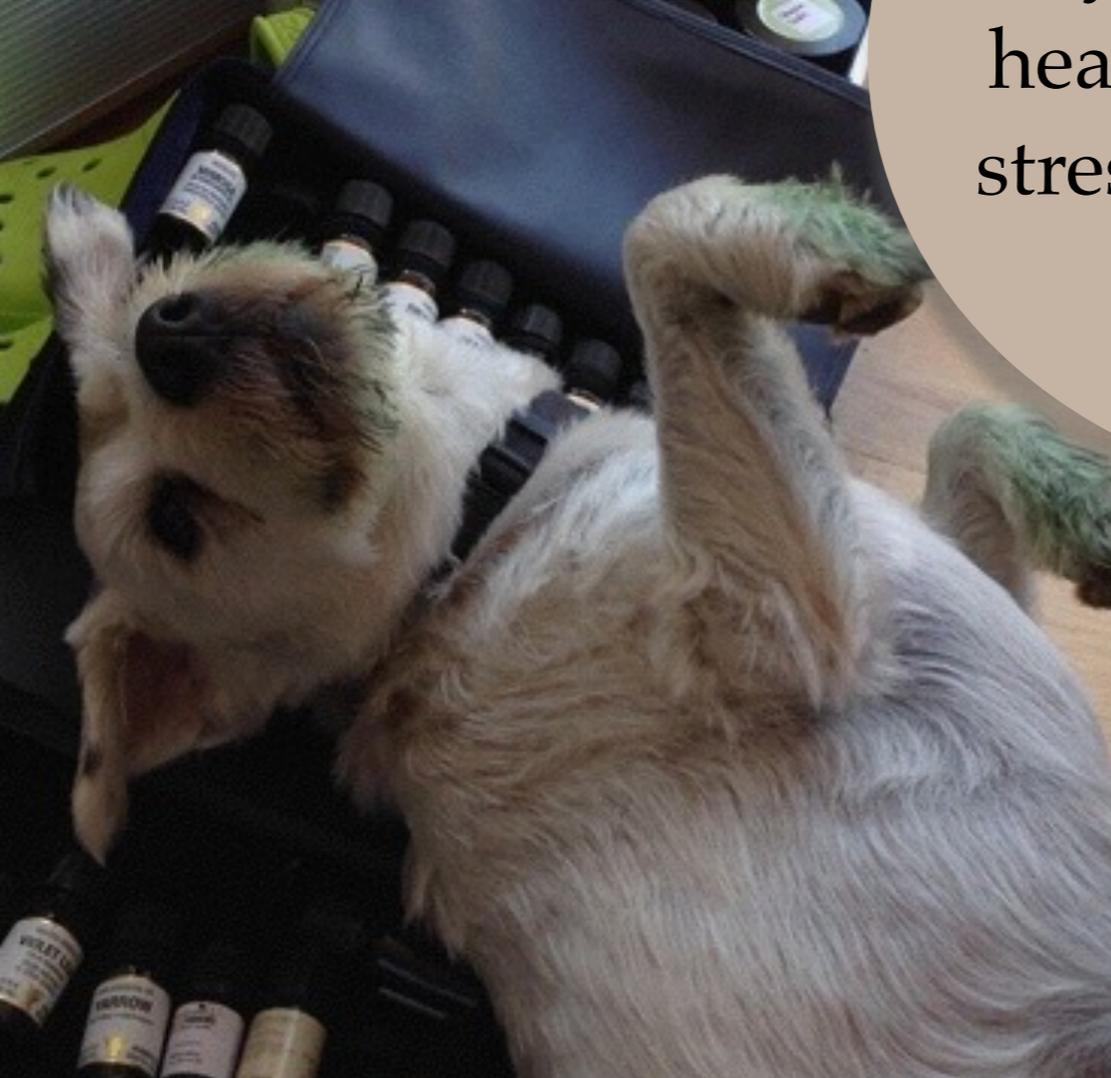
The levels of stress in dogs and their owners follow each other, according to a new study from Linköping University, Sweden. The scientists believe that dogs mirror their owner's stress level, rather than vice versa.

Published in the scientific journal Scientific Reports.

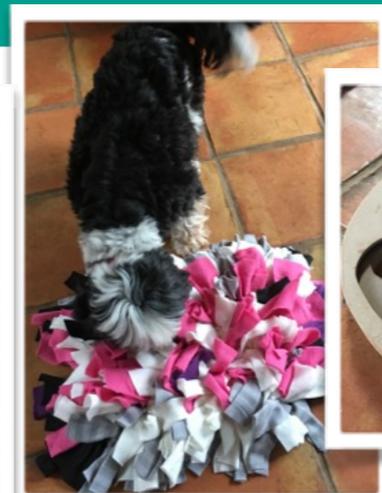
“We found that the levels of long-term cortisol in the dog and its owner were synchronised, such that owners with high cortisol levels have dogs with high cortisol levels, while owners with low cortisol levels have dogs with low levels”, Ann-Sofie Sundman of the Department of Physics, Chemistry and Biology (IFM) at LiU, principal author of the study



If you want a happy,
healthy dog, keep the
stress chemicals down



- Understand adrenaline & cortisol build-up and stress triggers
- Remove or reduce those stress triggers
- Comfort, company, sleep, safety and security are paramount
- Reduce commands and give choices
- Mental stimulation is vital for physical and mental health
- Slow sniffing walks are best for muscles and the brain
- Let your dog sniff and decide the direction of the walk
- Get your dog to find a ball or object instead of throwing
- Treat searches / nosework / scentwork / tracking / finding things



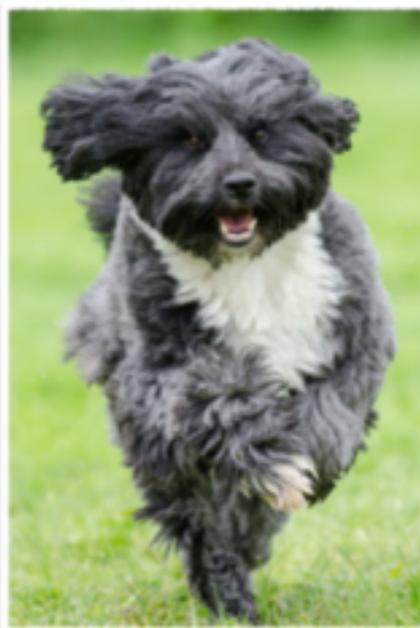
PDFs of my leaflets are available on my website to download and share



HAPPY HEALTHY DOG

STRESS

HOW TO RECOGNISE
AND MANAGE STRESS

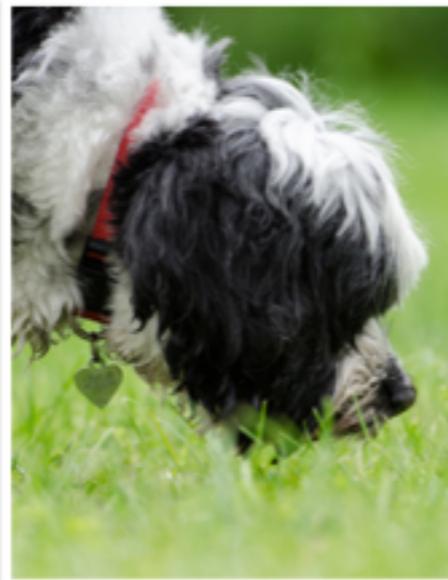


Many behavioural and physical problems arise from stress. Recognise the signs and triggers and help your dog to be happy and healthy

HAPPY HEALTHY DOG

THE IMPORTANCE OF SMELL

A VITAL SURVIVAL TOOL



Like their ancestors, all dogs need active sniffing each day for good mental health, stimulation and calm behaviour

HAPPY HEALTHY DOG

SENIOR DOGS

HELP THEM TO ADAPT



A curious dog may live longer
Keep the curiosity intact - it helps
the brain to be active

www.animaltherapyworks.co.uk

This is also a brilliant resource of many different leaflets on canine behaviour, how to reduce stress and other related subjects have www.dogbrochures.com/brochures



Signs of pain in dogs Part2



Stress in dogs ?!



Meet & Greet an unknown dog



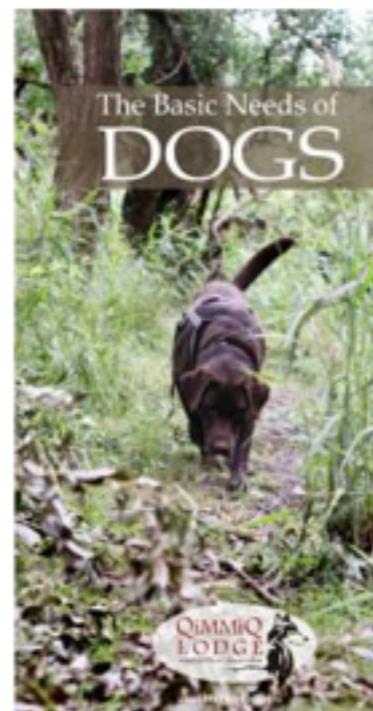
Mental Aktivisering



Etiquette at the vet



3 claves para disfrutar del



The basic needs of dogs



How to walk your dog

Woof woof!



References

Institute of Canine Biology - The Biology of Dogs & Genetics Course

Dominance in Dogs - Fact or Fiction - Barry Eaton

Adrenal Fatigue - The 21st Century Stress Syndrome - J. Wilson

The Cortisol Connection - Shawn Talbott PHD

Adrenaline Dominance - Michael E. Platt, MD

The Epigenetics Revolution - Nessa Carey

The Biology of Belief - Bruce Lipton

Canine Nutrigenomics - W Jean Dodds DVM, & Diana R Laverdure

My Healthy Dog Course - Nutrigenomics - W Jean Dodds DVM, & Diana R Laverdure

DNM University - Pet Food Nutrition

Rodney Habib - Dogs Naturally Magazine

www.scientificamerican.com

<http://www.petmd.com/>

Living With Your Dog - Winkie Spiers

The Canine Kingdom of Scent - Ann Lill Kvam

Calming Signals - Turid Rugaas

My Dog Pulls, What do I do? - Turid Rugaas

www.sciencedirect.com

Jenny Nyberg - Center for Brain Repair and Rehabilitation, University of Gothenburg, Sweden

Courses: Conversational Hypnosis

<http://www.pnas.org/content/102/21/7409.full>

Planet Paws (Robney Habib) TED Talk Cancer

The Brain Book - Rita Carter

Course - Coursera - The Gut Microbiome Course - Coursera / Universities of San Diego, California

Paper: Bestial boredom: a biological perspective on animal boredom and suggestions for its scientific investigation by Senior Animal Welfare Lecturer at the RVC - Charlotte C. Burn <http://www.sciencedirect.com/science/article/pii/S0003347217301811>

Kim, Doe-young; Camilleri, Michael. The American Journal of Gastroenterology; Cambridge 95.10 (Oct 2000): 2698-2709
Control of Brain Development, Function, and Behavior by the Microbiome - Timothy R. Sampson, Sarkis K. Mazmanian
Vince McNally BVSc VetMFHom MRCVS - Vince The Vet Superfood - vincethevet.co.uk

New Light on Link Between Gut Bacteria and Anxiety <http://neurosciencenews.com/anxiety-bacteria-gut-7374/>
<https://www.coursera.org/learn/early-vertebrate-evolution> - University of Alberta

Course - Practical Brain Science - The National Institute for the Clinical Application of Behavioural Medicine

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4259177/> The Gut Microbiome and the Brain

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5282855/> - Microbial production of vitamin B12: a review and future perspectives

How Stress Wreaks Havoc on your Gut <https://articles.mercola.com/sites/articles/archive/2012/04/09/chronic-stress-gut-effects.aspx>

Mental stress and gastric acid secretion. Do personality traits influence the response? <https://www.ncbi.nlm.nih.gov/pubmed/2384046>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC26223/> Inhibition of gastric acid secretion by stress: A protective reflex mediated by cerebral nitric oxide

Dr Paul Clayton - Author - Health Defence

<https://www.ncbi.nlm.nih.gov/pubmed/2384046> Mental stress and gastric acid secretion. Do personality traits influence the response?

<http://gut.bmj.com/content/47/6/861> The neurobiology of stress and gastrointestinal disease (copyright obtained for use in this presentation)

<https://en.wikipedia.org/wiki/Urination>

<http://www.anxietycentre.com/anxiety-symptoms/frequent-urination.shtml>

<https://courses.washington.edu/conj/bess/urination/urination.html>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4359909/> Neuropeptides and the Microbiota-Gut-Brain Axis

https://en.wikipedia.org/wiki/Neuropeptide_Y

<https://www.livescience.com/35462-genes-impact-stress-response-depression-risk.html>

<https://articles.mercola.com/sites/articles/archive/2017/05/10/chronic-fatigue-parkinsons-linked-to-gut-microbiome.aspx>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3516703/> Neuropeptide Y, peptide YY and pancreatic polypeptide in the gut-brain axis

Pet Professional Guild “How to Improve your Pet’s Gut Health” HOLLY H. GANZ PhD, Co-Founder and CEO AnimalBiome

Pannaraj et al. 2017. Association Between Breast Milk Bacterial Communities and Establishment and Development of the Infant Gut Microbiome. *JAMA Pediatrics*

Chassaing, B., et al. 2015. Dietary emulsifiers impact the mouse gut microbiota promoting colitis and metabolic syndrome. *Nature* 519, 92–96.

Palmnas, M.S., et al. 2014. Low-dose aspartame consumption differentially affects gut microbiota-host metabolic interactions in the diet-induced obese rat. *PLoS One* 9, e109841. Suez, J., et al. 2014. Artificial sweeteners induce glucose intolerance by altering the gut microbiota. *Nature* 514, 181–186.

Rogers, Mary AM, and David M. Aronoff 2016. "The influence of non-steroidal anti-inflammatory drugs on the gut microbiome." *Clinical Microbiology and Infection* 22.2: 178-e1.

Imhann F, et al. 2016. Proton pump inhibitors affect the gut microbiome. *Gut* 2016;65:740–748. doi:10.1136/gutjnl-2015-310376

https://scholar.colorado.edu/cgi/viewcontent.cgi?article=1154&context=honr_theses

https://www.researchgate.net/profile/Bernardo_Petritz/publication/272480734_The_Microbiota_an_Exercise_Immunology_Perspective/links/54ee51a00cf2e55866f2871a.pdf

Barrett E, Ross RP, O’Toole PW, Fitzgerald GF, Stanton C. γ -Aminobutyric acid production by culturable bacteria from the human intestine. *J Appl Microbiol* 113(2): 411-417, 2012.

Chow J, Tang H, Mazmanian SK. Pathobionts of the gastrointestinal microbiota and inflammatory disease. *Curr Opin Immunol* 23: 473–480, 2011.

Crumevolle-Arias V, Jaglind V, Bruneaud A, Vancasself S, Cardona A, Dauge V, Naudon L, Rabot S. Absence of the gut microbiota enhances anxiety-like behavior and neuroendocrine response to acute stress in rats. *Psychoneuroendocrinology* 42: 207-217, 2014

Bailey MT, Dowd SE, Galley JD, Hufnagle AR, Allen RG, Lyte M. Exposure to a social stressor alters the structure of the intestinal microbiota: implications for stressor-induced immunomodulation. *Brain, Behavior, and Immunity* 25: 397- 407, 2011.

Bailey MT, Coe CL. Maternal separation disrupts the integrity of the intestinal microflora in infant rhesus monkeys.

Freestone PP, Williams PH, Haigh RD, Maggs AF, Neal CP, Lyte M. Growth stimulation of intestinal commensal *Escherichia coli* by catecholamines: a possible contributory factor in trauma-induced sepsis. *Shock* 18: 465-470, 2002.

Lyte M, Ernst S. Catecholamine induced growth of gram negative bacteria. *Life Sci* 50: 203-212, 1992.

Grenham et al., 2011).
Borre et al., 2014)
Sudo et al., 2004; Moloney et al., 2014).
Front. Cell. Neurosci., 14 October 2015 | <https://doi.org/10.3389/fncel.2015.00392>
Wang and Wu, 2005; O'Mahony et al., 2009; Galley et al., 2014a,b; De Palma et al., 2015
Bravo et al., 2011
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4048923/>

Fox, M. W., Inman, O. R. and Himwich, W. A. (1966), The postnatal development of neocortical neurons in the dog. *J. Comp. Neurol.*, 127: 199–206. doi:10.1002/cne.901270205
<https://authors.library.caltech.edu/56514/>
<https://authors.library.caltech.edu/56514/>
<http://www.pandys.org/articles/invisibleepidemic.html>
https://en.wikipedia.org/wiki/Clive_Wearing
<http://www.nature.com/news/2010/100407/full/news.2010.169.html>
www.ncbi.nlm.nih.gov/pmc/articles/PMC1472861/

Chassaing, B., et al. 2015. Dietary emulsifiers impact the mouse gut microbiota promoting colitis and metabolic syndrome. *Nature* 519, 92–96.

Palmnas, M.S., et al. 2014. Low-dose aspartame consumption differentially affects gut microbiota-host metabolic interactions in the diet-induced obese rat. *PLoS One* 9, e109841.

Suez, J., et al. 2014. Artificial sweeteners induce glucose intolerance by altering the gut microbiota. *Nature* 514, 181–186.

Igarashi, Hirotaka, et al 2014. "Effect of oral administration of metronidazole or prednisolone on fecal microbiota in dogs." *PLoS One* 9.9: e107909.

www.ncbi.nlm.nih.gov/pmc/articles/PMC4202343/

https://www.whole-dog-journal.com/issues/9_7/features/Canine_Adrenal_Glands_15824-1.html

<https://drjockers.com/>

<https://www.dailymail.co.uk/news/article-3800195/Dangerous-levels-cancer-causing-toxin-Erin-Brockovich-fought-against-tap-water-drunk-218-MILLION-Americans.html>

<https://brokenbrain.com>

<https://www.inc.com/ariana-ayu/can-you-smell-your-way-to-a-better-brain-science-says-yes.html>

https://products.mercola.com/healthypets/pet-beds/?utm_source=petsnl&utm_medium=email&utm_content=dpe&utm_campaign=20190413Z2&et_cid=DM279659&et_rid=591462100

<https://www.ncbi.nlm.nih.gov/pubmed/29126512> - Endocrine Disruptors

<https://www.scientificamerican.com/article/do-dogs-have-mirror-neurons/>

<https://www.dailydogdiscoveries.com/tag/dog-mirror-neurons/>

<https://www.livescience.com/45730-cats-dogs-intelligence.html>

<https://www.sciencealert.com/dogs-smarter-than-cats-science-high-neuron-density-among-carnivores>

<https://www.carnivora.ca/html/carnivora-dogs/Dog-Nutrition/index.cfm>

https://en.wikipedia.org/wiki/Nervous_system

<https://mindmatters.ai/2019/05/how-the-injured-brain-heals-itself-our-amazing-neuroplasticity/>

<http://www.brainfacts.org/Brain-Anatomy-and-Function/Anatomy/2012/The-Neuron>

<https://oueverydaylife.com/530281-herbs-that-contain-zinc.html>

<https://www.optimallivingdynamics.com/blog/25-proven-ways-to-promote-the-regeneration-of-myelin>

<https://articles.mercola.com/sites/articles/archive/2014/10/13/turmeric-curcumin.aspx>

30 Second Brain: The 50 Most Mind0-blowing ideas in neuroscience, each explained in half a minute by Anil Seth