FORVET | FORMACIÓN INTEGRAL VETERINARIA

TERAPIA DEL DOLOR – DOLOR ONCOLÓGICO

Profa. Adja. Nadia Crosignani

PACIENTES ONCOLÓGICOS

Principal causa de muerte en perros gerontes

Aumento de sobrevida de perros oncológicos

- Procedimentos quirúrgicos electivos o emergenciales
- Procedimentos paliativos
- Diagnóstico por imagem
- Quimioterapia, radioterapia
- Terapia Antálgica Multimodal!!

Objetivo primário no tratamento oncológico

MELHORA DA QUALIDADE DE VIDA!

1. Você acha que a doença atrapalha a vida do seu animal?
0. ( ) muitíssimo
1. ( ) muito
2. ( ) um pouco
3. ( ) não

2. O seu animal continua fazendo as coisas que gosta (brincar, passear...)?
0.( ) nunca mais fez
1.( ) raramente
2.( ) freqüentemente
3.( ) normalmente

3. Como está temperamento do seu animal?
0.( ) totalmente alterado
1.( ) alguns episódios de alteração
2.( ) mudou pouco
3.( ) normal

4. O seu animal manteve os hábitos de higiene (lamber-se, p. ex.)?
0.( ) não
1.( ) raramente
2.( ) menos que antes
3.( ) está normal

5. Você acha que o seu animal sente dor?
0.( ) sempre
1.( ) freqüentemente
2.( ) raramente
3.( ) nunca

6. O seu animal tem apetite?
0.( ) não
1.( ) só come forçado/só o que gosta
2.( ) pouco
3.( ) normal

7. O seu animal se cansa facilmente?
0.( ) sempre
1.( ) freqüentemente
2.( ) raramente
3.( ) está normal

8. Como está o sono do seu animal?
0.( ) muito ruim
1.( ) ruim
2.( ) bom
3.( ) normal

9. O seu animal tem vômitos?
0.( ) sempre
1.( ) freqüentemente
2.( ) raramente
3.( ) não

10. Como está o intestino do seu animal?
0.( ) péssimo/funciona com dificuldade
1.( ) ruim
2.( ) quase normal
3.( ) normal

11. O seu animal é capaz de se posicionar sozinho para fazer xixi e cocô?
0.( ) nunca mais conseguiu
1.( ) raramente consegue
2.( ) às vezes consegue
3.( ) consegue normalmente

12. Quanta atenção o animal está dando para a família?
0.( ) está indiferente
1.( ) pouca atenção
2.( ) aumentou muito (carência)
3.( ) não mudou/está normal

Fantoni & Yazbek, 2005

Development and psychometric testing of the Canine Owner-Reported Quality of Life questionnaire, an instrument designed to measure quality of life in dogs with cancer

Michelle A. Giuffrida VMD, MSCE
Dorothy Cimino Brown DVM, MSCE
Susan S. Ellenberg PhD

OBJECTIVE
To describe development and initial psychometric testing of an owner-reported questionnaire designed to standardize measurement of general quality of life (QOL) in dogs with cancer.

		Number of days in the past week
		NEVER EVERY DAY
V1	My dog had a lack of energy	0 1 2 3 4 5 6 7
C1	My dog's appetite was decreased	0 1 2 3 4 5 6 7
C2	My dog was reluctant to get up	0 1 2 3 4 5 6 7
P1	My dog had pain or discomfort	0 1 2 3 4 5 6 7
V2	My dog's treatment interfered with his/her enjoyment of life	0 1 2 3 4 5 6 7
		NEVER EVERY DAY
C3	My dog enjoyed being near me	0 1 2 3 4 5 6 7
V3	My dog was playful	0 1 2 3 4 5 6 7
C4	My dog showed a normal amount of affection	0 1 2 3 4 5 6 7
C5	My dog enjoyed being pet or touched	0 1 2 3 4 5 6 7
V4	My dog did his/her favorite activities	0 1 2 3 4 5 6 7
P2	My dog slept well at night	0 1 2 3 4 5 6 7
V5	My dog acted like his/her normal self	0 1 2 3 4 5 6 7

		NEVER							EVERY DAY
M1	My dog had trouble getting up or lying down	0	1	2	3	4	5	6	7
M2	My dog had trouble going for a walk	0	1	2	3	4	5	6	7
M3	My dog fell or lost balance	0	1	2	3	4	5	6	7
C6	My dog did not eat his/her normal food	0	1	2	3	4	5	6	7
M4	My dog had trouble getting comfortable	0	1	2	3	4	5	6	7
		Number of days in the past week							

Please **mark an X** on the line below to show your dog's overall quality of life **during the past week**.

|----------|

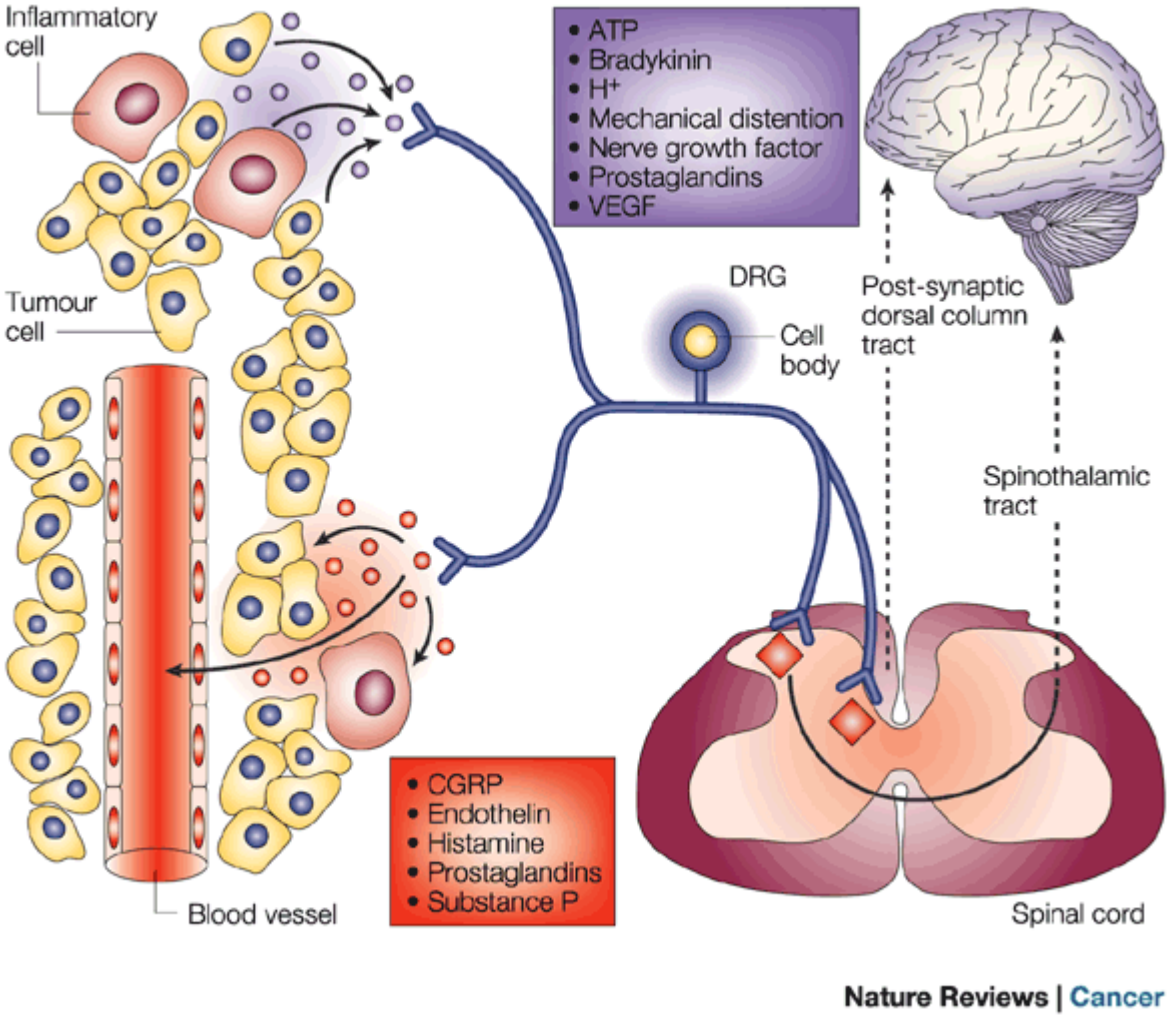
WORST IMAGINABLE QUALITY OF LIFE

PERFECT QUALITY OF LIFE

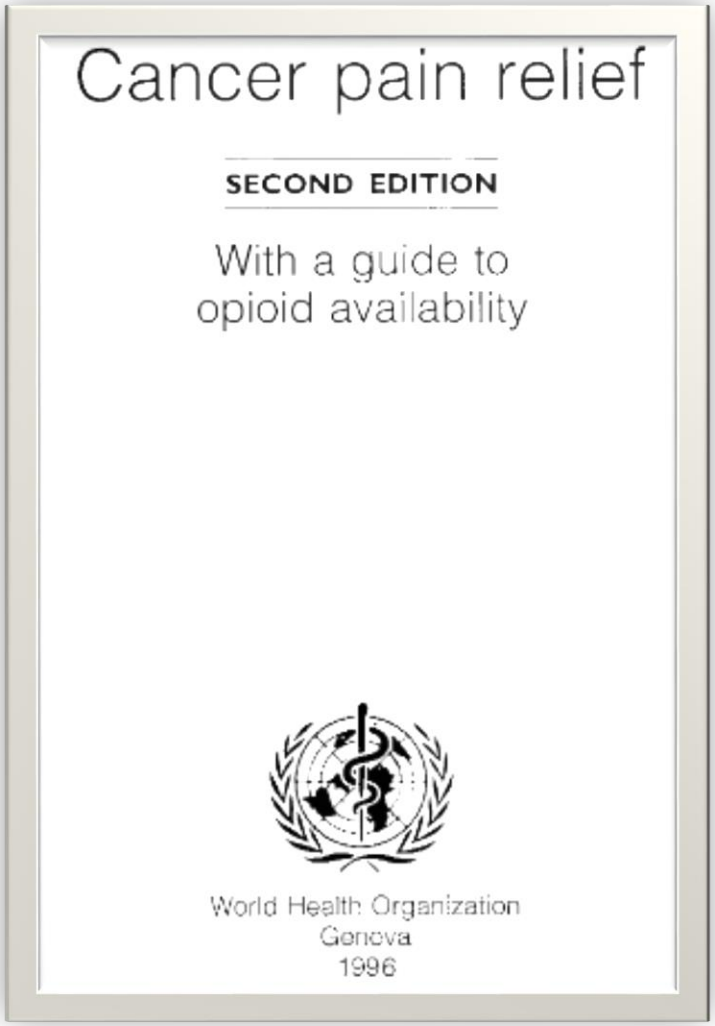
DOLOR EN ONCOLOGÍA

- Prevalencia dolor 28% de recién diagnosticados, 50% con enfermedad oncológica, 80% en pacientes avanzados.

- Oligoanalgesia en 56 a 82,3% de los pacientes (Filippiadis et al., 2019).
- Dolor nociceptivo o neuropático
- Dolor refractario: Intervencionismo con
  - técnicas percutáneas de neurolisis,
  - embolismo transarterial,
  - ablación por radiofrecuencia (RFA), ablación por microondas (MWA), crioablación y HIFU guiado por RM



Patrick W. Mantyh et. al, Nature Reviews Cancer 2, 201-209. 2002.



Pain syndromes in patients with cancer[a]

Caused by cancer

Tumour involvement of bone:
- metastases to the cranial vault and base of skull
- metastases to vertebral body
  - fracture of the odontoid process
  - C7-T1 metastases
  - L1 metastases
  - sacral syndrome

Tumour involvement of viscera

Tumour involvement of nervous system:
- cranial neuralgia
  - — trigeminal
  - — glossopharyngeal
- peripheral nerves
- intercostal neuropathy
- brachial plexopathy
- lumbosacral plexopathy
- radiculopathy
- leptomeningeal metastases
- spinal cord compression
- intracranial metastases

Caused by anticancer treatment

Post-surgery:
- acute postoperative pain
- post-thoracotomy syndrome
- post-mastectomy syndrome
- post-neck-dissection syndrome
- phantom limb syndrome

Post-chemotherapy:
- oral mucositis
- bladder spasms
- aseptic necrosis of the femoral head
- steroid pseudorheumatism
- post-herpetic neuralgia
- peripheral neuropathy

Post-radiotherapy:
- oral mucositis
- oesophagitis
- skin burns
- radiation fibrosis of brachial and lumbar plexus

Table 3

Classification of pain according to neural mechanism

Type of pain	Mechanism	Example
Nociceptive	Stimulation of nerve endings	
Visceral		Hepatic capsule pain
Somatic		Bone pain
Muscle spasm		Cramp
Neuropathic		
Nerve compression	Stimulation of nervi nervorum	
Nerve injury		
— peripheral[a]	Injury to peripheral nerve ("deafferentation pain")	Neuroma or nerve infiltration (e.g. brachial or lumbosacral plexus)
— central	Injury to central nervous system	Spinal cord compression or post-stroke pain
— mixed	Peripheral and central injury	Post-herpetic neuralgia
Sympathetically maintained[b]	Injury to sympathetic nerves	Some chronic post-surgical pains

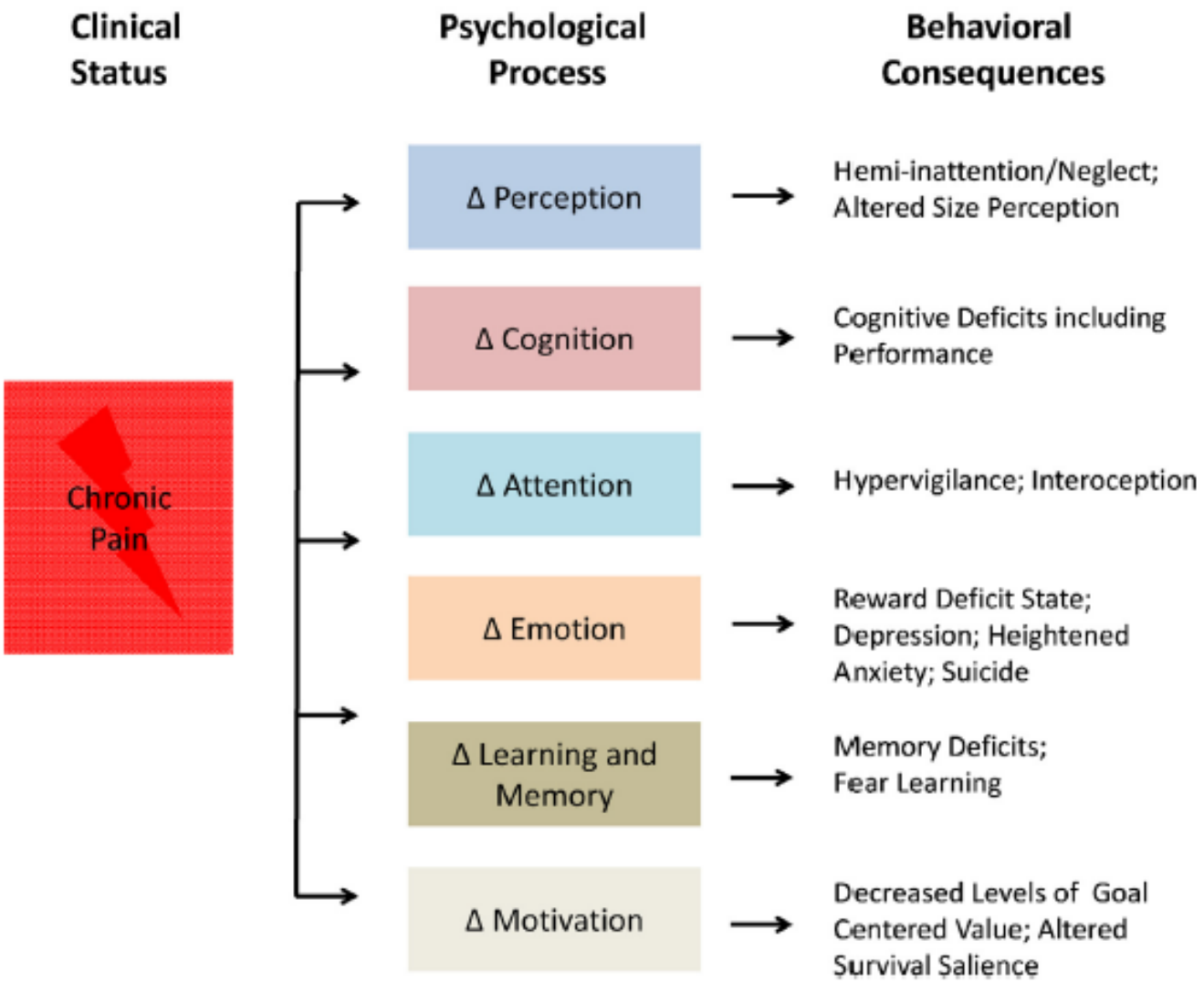
[a] Characterized by superficial burning pain or stabbing pain with sensory loss in a neurodermatomal pattern.

[b] Characterized by superficial burning pain in an arterial pattern. Some nerve injury pains have a sympathetic component (e.g. Panccast syndrome).

QUÉ TUMORES CAUSAN FRECUENTEMENTE DOLOR?

- Hueso
- CNS
- Cutáneo invasivo y ulcerados
- TGI: esófago, estómago, colon y recto
- Intranasal
- Intratoráxica y abdominal
- Carcinoma mamario inflamatorio
- Oral y faringe (menos encía)
- Próstata
- Cirugía cuando asociado a dolor neuropático

DOLOR ONCOLÓGICO


Clinical Status
Psychological Process
Behavioral Consequences
Chronic Pain
Δ Perception
Hemi-inattention/Neglect; Altered Size Perception
Δ Cognition
Cognitive Deficits including Performance
Δ Attention
Hypervigilance; Interoception
Δ Emotion
Reward Deficit State; Depression; Heightened Anxiety; Suicide
Δ Learning and Memory
Memory Deficits; Fear Learning
Δ Motivation
Decreased Levels of Goal Centered Value; Altered Survival Salience

Acta Veterinaria Hungarica 63 (4), pp. 451–457 (2015)
DOI: 10.1556/004.2015.042

QUALITY OF LIFE AND PAIN IN DOGS WITH EARLY-STAGE MAMMARY TUMOURS

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Rua Dr. Bacelar 1212, São Paulo, 04026002, Brazil

(Received 22 November 2014; accepted 22 June 2015)

- 1 tumor mamario no ulcerado, de 1 a 3 cms de diámetro, T1 (TNM), sin linfonódulos comprometidos, sin metástasis distantes, sin otras enfermedades concomitantes ni intervenciones de ningún tipo (quirúrgicas o medicamentosas)

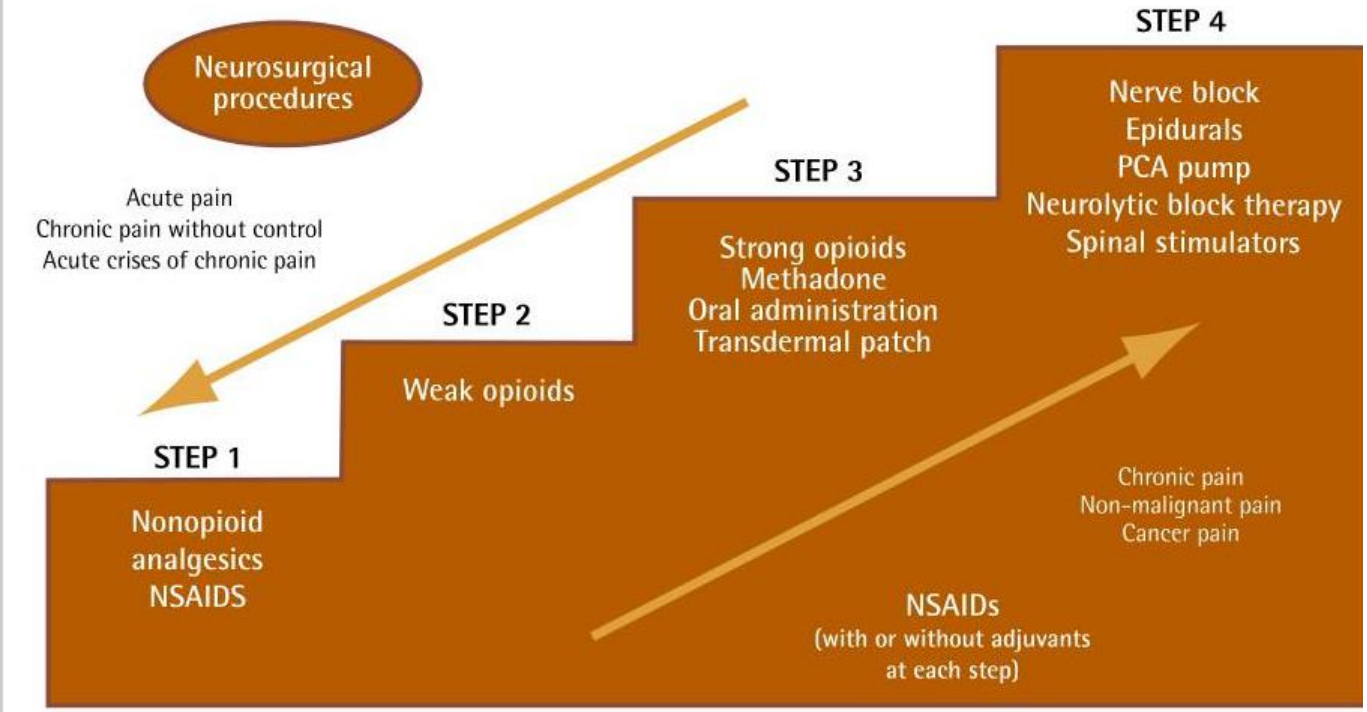
- Escala de calidad de vida de Yazbek y Fantoni (2005), puntuación de 0 a 36.

Prevalence and risk analysis based on the results obtained through the pain and quality of life questionnaire for canine mammary tumour patients

Factor	Group 1 – dogs without MT (%)	Group 2 – dogs with MT (%)	Relative risk
1 – Disturbing the animal's life	18/50 (36)	62/80 (77.50)*	2.10*
2 – Does not keep doing the same things	27/50 (54)	46/80 (57.50)	1.0
3 – Loses hygiene habits	12/50 (24)	51/80 (63.75)*	5.0*
4 – Behavioural changes	5/50 (10)	40/80 (50.00)*	2.6*
5 – Presence of pain	5/50 (10)	67/80 (83.75)*	8.3*
6 – Change of appetite	40/50 (80)	41/80 (51.25)	0.6
7 – Displays tiredness	16/50 (32)	54/80 (67.50)*	2.0*
8 – Shows changes in sleep	14/50 (28)	38/80 (47.50)	1.6*
9 – Displays respiratory distress or vomiting	5/50 (10)	30/80 (37.50)*	3.7*
10 – Presents intestinal disorders	15/50 (30)	44/80 (55.00)*	1.8*
11 – Presence of postural changes to defecate	2/50 (4)	33/80 (41.20)*	10.2*
12 – Increase of grace / family care	1/50 (2)	34/80 (42.50)*	21.0*

*Results of χ^2-test for two independent proportions, $P < 0.05$

Figure 2. New adaptation of the analgesic ladder



NSAID—nonsteroidal anti-inflammatory drug, PCA—patient-controlled analgesia.

Review > Pain Manag. 2017 Jul;7(4):287-298. doi: 10.2217/pmt-2017-0006. Epub 2017 Mar 13.

Latin-American guidelines for cancer pain management

Argelia Lara-Solares [1], Marisol Ahumada Olea [2], Amparito de Los Ángeles Basantes Pinos [3], Sara Bistre Cohén [4], Patricia Bonilla Sierra [5], Eva Rossina Duarte Juárez [6], Omar A Símon Escudero [7], Juan Guillermo Santacruz Escudero [8], José Alberto Flores Cantisani [9]

Affiliations + expand

PMID: 28326952 DOI: 10.2217/pmt-2017-0006

Table 1. Types of episodic pain. (Table view)

Pain	Incident	Breakthrough	At the end of the dose
Definition	Transient and predictable pain that responds to a voluntary stimulus (standing, walking, moving on bed), involuntary (sneezing, coughing), procedural (bed sores healing, paracentesis, abscess drainage) and emotional	Transient without known triggering stimuli (or trigger factor), usually severe, fast onset. Nociceptive origin, neuropathic origin or both	Occurs before the administration of the next dose
Prevalence	32–94%	28–45% (29)	
Cause	Bone metastasis (more frequent)	Tumor affecting nerve roots	Inadequate control of baseline chronic pain

Data taken from [**11**,**15**,**24–25**,**29**].

DOLOR IRRUPTIVO ONCOLOGICO (DIO)

«una exacerbación transitoria de dolor que aparece, ya sea espontáneamente o relacionada con un desencadenante concreto, predecible o impredecible, a pesar de existir un dolor estable y adecuadamente controlado»

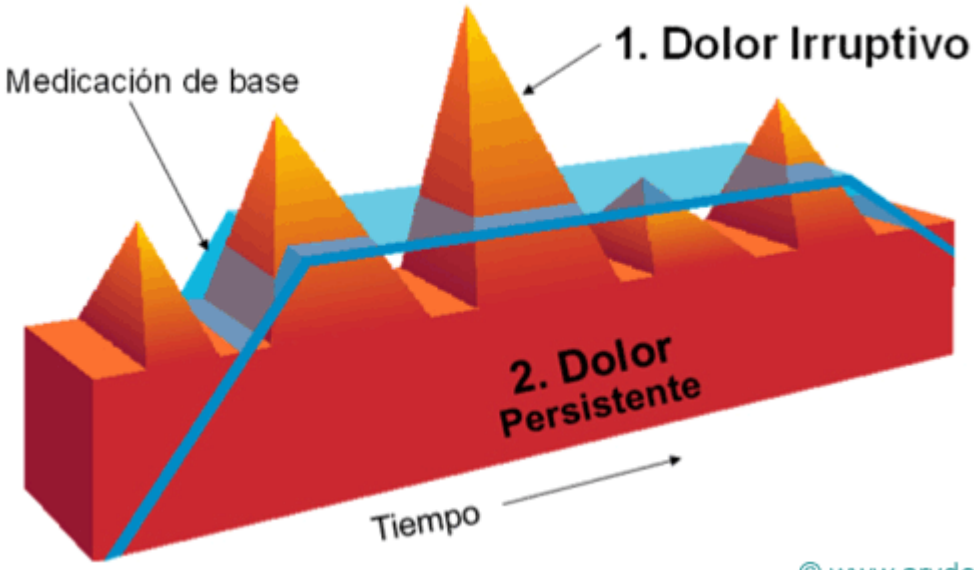


Table 2. Opioids recommended for treatment of moderate pain cancer in opioid-naive patients. (Table view)

Opioid	Type of opioid	Dose
Tramadol with or without paracetamol	Weak	<400 mg/day
Codeine with or without paracetamol	Weak	<360 mg/day
Morphine	Strong	<30 mg/day
Oxycodone with or without paracetamol	Strong	<20 mg/day
Hydromorphone	Strong	<4 mg/day

Data taken and modified from [**41**].

Table 3. Equianalgesic doses. (Table view)

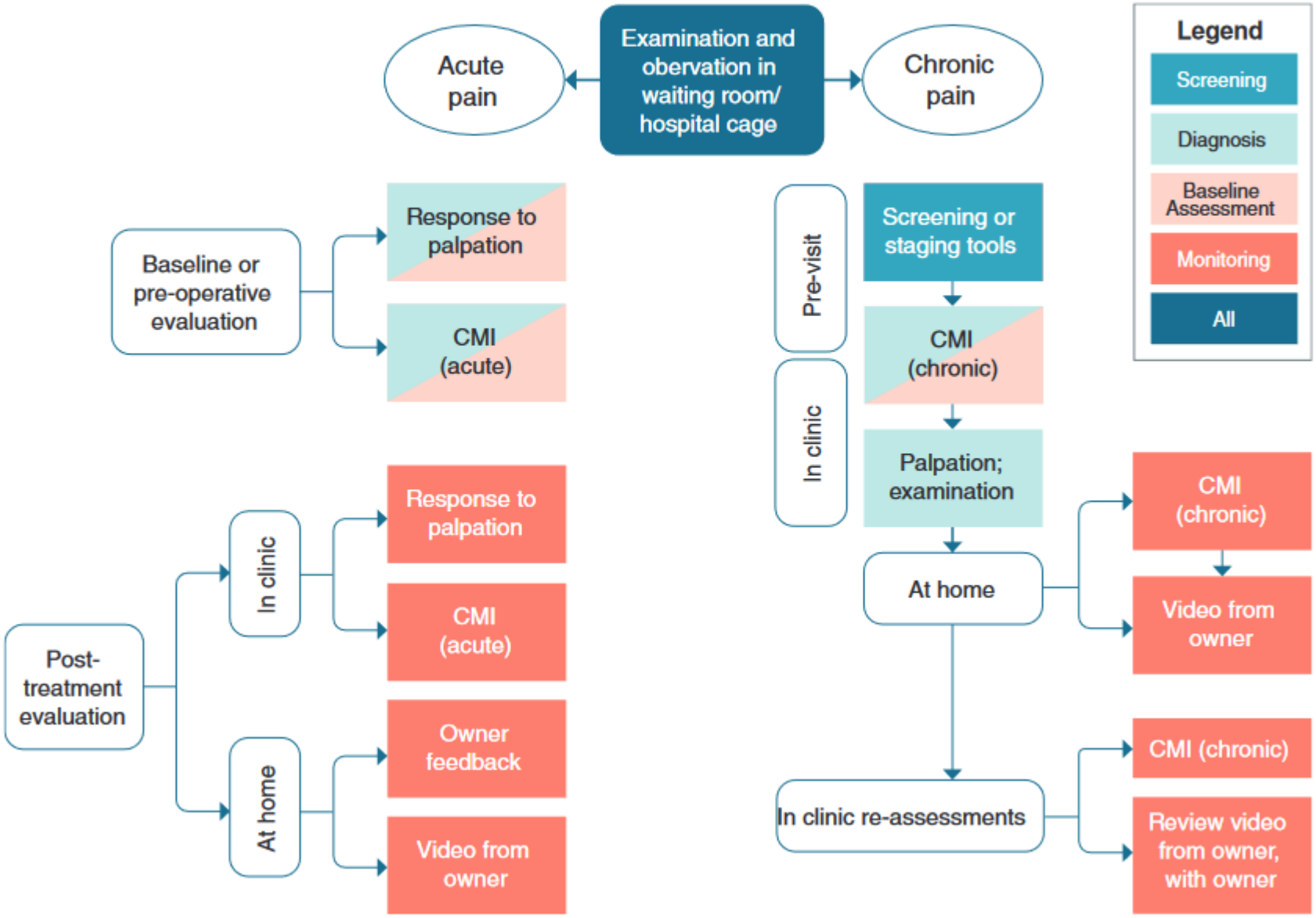
Drug	Parenteral	Oral
Morphine	10 mg	30 mg
Codeine	100 mg	200 mg
Fentanyl	0.1 mg	
Hydromorphone	1.5 mg	7.5 mg
Oxycodone	10 mg	20 mg
Tramadol	100 mg	120 mg

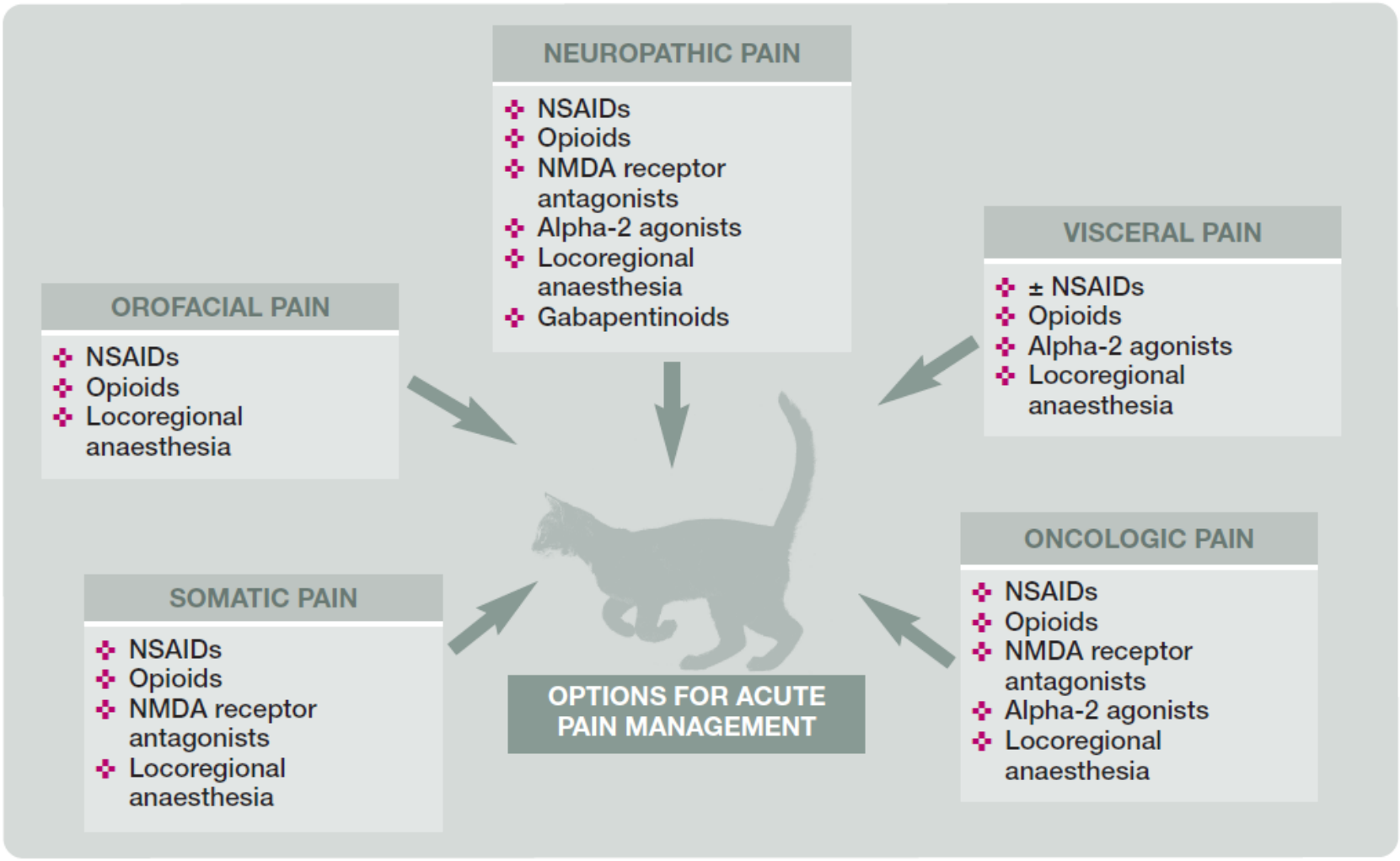
Data taken and modified from [**36**,**47**]

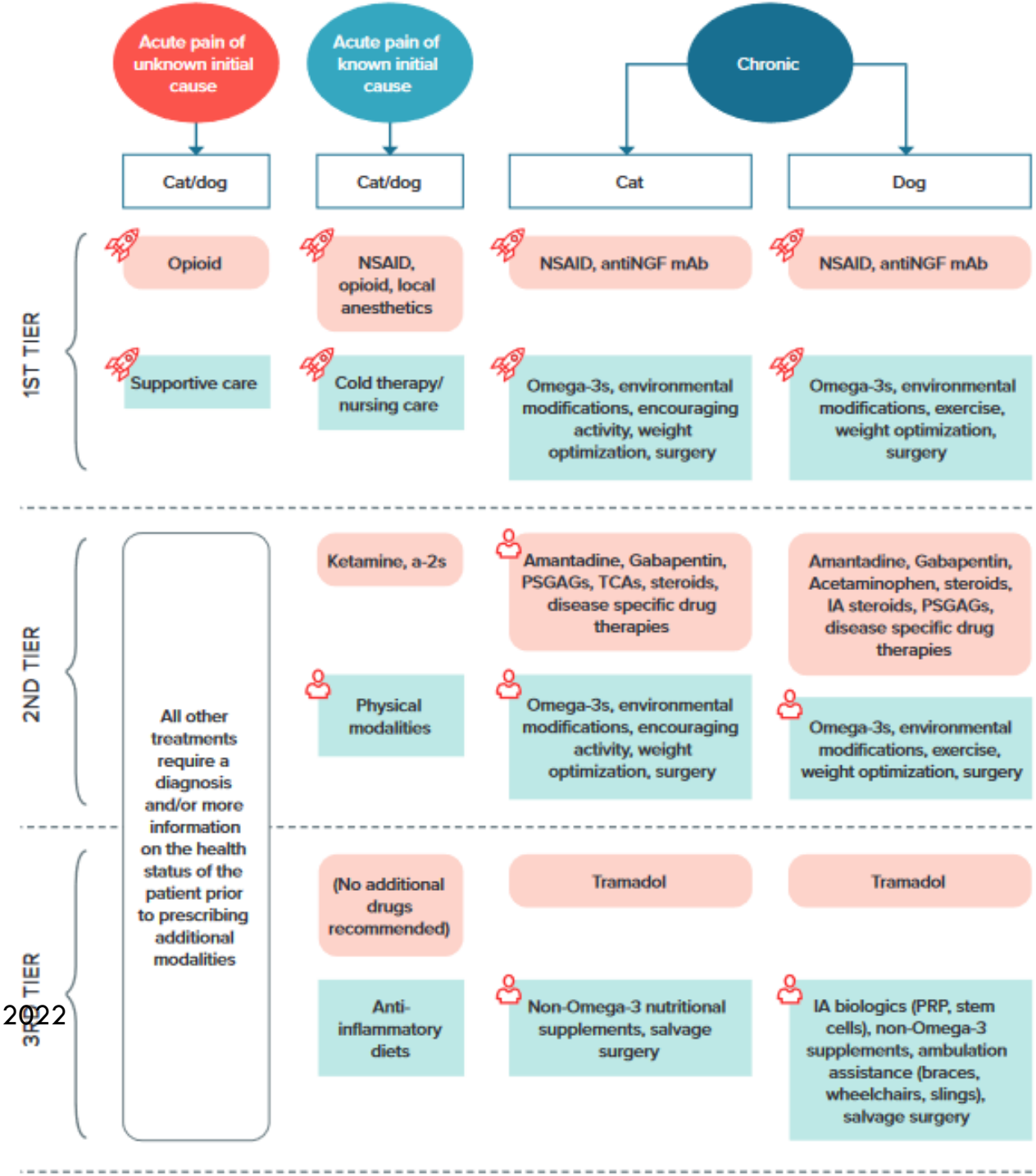
Table 6. Adjuvant analgesics.

Type of drug	Daily recommended dose	Route	Indications
Antidepressants	Amitriptyline 10 to 25–150 mg/day Nortriptyline 25 mg/day Desipramine 10 to 25–150 mg/day Venlafaxine 37.5–150 mg/day Duloxetine 30–120 mg/day	Oral	Neuropathic pain
Anticonvulsants	Gabapentin 1200–3600 mg/day Pregabalin 150–600 mg/day	Oral	Neuropathic pain
Corticosteroids	Dexamethasone 4–24 mg/day	Oral/iv.	Neuropathic, bone, visceral pain, brain edema, spinal cord compression
Lidocaine	Patches 5%/day Bolus 1–2 mg/kg in 15–30 min. If effective, 2 mg/kg/h	Topical iv.	Neuropathic pain
NMDA antagonists	Ketamine: 0.04–0.3 mg/kg/h Amantadine Magnesium 1 g/day	iv./oral/sc./sl./topical Oral iv.	Neuropathic pain Tolerance to opioids
Bisphosphonates	Pamidronate 60 to 90 mg every 2–4 weeks Zoledronic acid 4 mg every 3–4 weeks Ibandronate 6 mg × 3 days, then every 3–4 weeks	iv.	Osteolytic bone pain

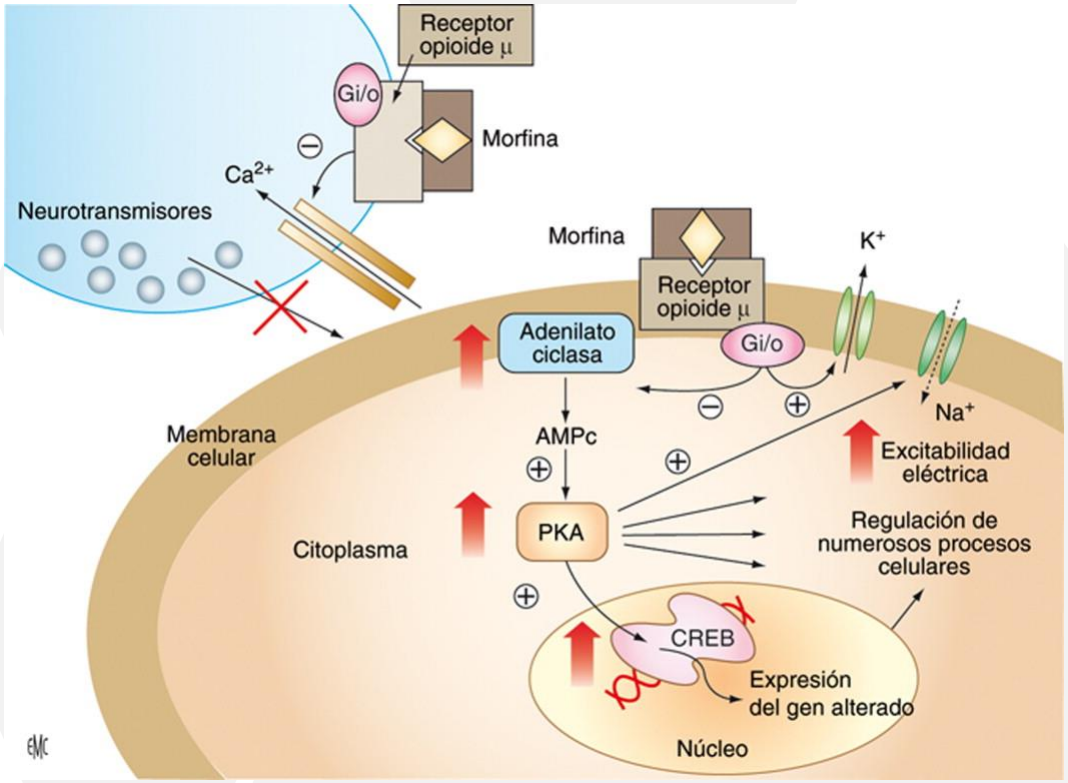
iv.: Intravenous; sc.: Subcutaneous; sl.: Sublingual.
Data taken from [12,43,50–51].


Examination and obervation in waiting room/ hospital cage
Acute pain
Chronic pain
Legend
Screening
Diagnosis
Baseline Assessment
Monitoring
All
Baseline or pre-operative evaluation
Response to palpation
CMI (acute)
Post-treatment evaluation
In clinic
Response to palpation
CMI (acute)
At home
Owner feedback
Video from owner
Pre-visit
Screening or staging tools
CMI (chronic)
In clinic
Palpation; examination
At home
CMI (chronic)
Video from owner
In clinic re-assessments
CMI (chronic)
Review video from owner, with owner


NEUROPATHIC PAIN
NSAIDs
Opioids
NMDA receptor antagonists
Alpha-2 agonists
Locoregional anaesthesia
Gabapentinoids
OROFACIAL PAIN
NSAIDs
Opioids
Locoregional anaesthesia
VISCERAL PAIN
± NSAIDs
Opioids
Alpha-2 agonists
Locoregional anaesthesia
SOMATIC PAIN
NSAIDs
Opioids
NMDA receptor antagonists
Locoregional anaesthesia
ONCOLOGIC PAIN
NSAIDs
Opioids
NMDA receptor antagonists
Alpha-2 agonists
Locoregional anaesthesia
OPTIONS FOR ACUTE PAIN MANAGEMENT



AAHA Guidelines, 2022


Receptor opioide μ
Gi/o
Morfina
Ca2+
Neurotransmisores
Morfina
Receptor opioide μ
K+
Adenilato ciclasa
Gi/o
Na+
Membrana celular
AMPc
Excitabilidad eléctrica
Citoplasma
PKA
Regulación de numerosos procesos celulares
CREB
Expresión del gen alterado
Núcleo

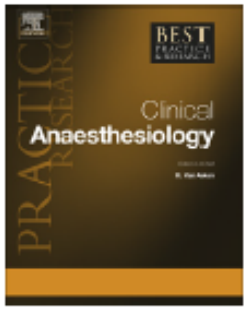
OPIOIDES

Best Practice & Research Clinical Anaesthesiology 28 (2014) 139–151

Contents lists available at ScienceDirect

Best Practice & Research Clinical Anaesthesiology

journal homepage: www.elsevier.com/locate/bean



4

The role of analgesics in cancer propagation

Jonathan R. Meserve, MD, Senior Resident [a, *], Alan David Kaye, MD, PhD, DABA, DABPM, DABIPP, Professor and Chairman [b], Amit Prabhakar, MD, MS, Senior Resident [b], Richard D. Urman, MD, MBA, Assistant Professor [c]

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OPIOIDES

Table 1
Immunomodulatory and neuroendocrine effects of opioids.

	Animal studies	Human studies
Innate immunity: [9,12,78,79]	•Decreased NK cell activity	•Decreased NK cell activity
Adaptive immunity: [80,81]	•Increased T cell apoptosis •Increased Thymic and splenic atrophy	
Neuroendocrine system: [82]	•Varying ACTH, CRH, and cortisol response to dose and duration of exposure •Increased GH and prolactin secretion •Decreased TSH secretion	•Decreased ACTH, CRH, and cortisol levels with possible adrenal suppression •Increased GH, prolactin, and TSH secretion •Hyperglycemia and impaired insulin secretion

NK cell = natural killer cell, GH = growth hormone, TSH = thyroid stimulating hormone, HPA = hypothalamic pituitary adrenal axis, ACTH = adrenocorticotropic hormone, CRH = corticotropin releasing hormone.

Review > J Pain Symptom Manage. 2005 May;29(5 Suppl):S25-31.
doi: 10.1016/j.jpainsymman.2005.01.006.

Immunologic effects of opioids in the presence or absence of pain

Gayle G Page [1]

Affiliations + expand

PMID: 15907644 DOI: 10.1016/j.jpainsymman.2005.01.006

Free article

MORFINA

- Supresión actividad celular de Natural Killer
- Producción citoquinas inflamatorias
- Inducción mitógena de proliferación linfática

- Receptores centrales vinculados a estos efectos, y atenuados por naltrexona

- Efectos son dosis dependiente

- Administración crónica de opioides vinculado a inmunosupresión, que sería mayor al inicio de los tratamientos multidosis (a los 14 días habría menos, o nula inmunosupresión)

OPIOIDES + DOLOR

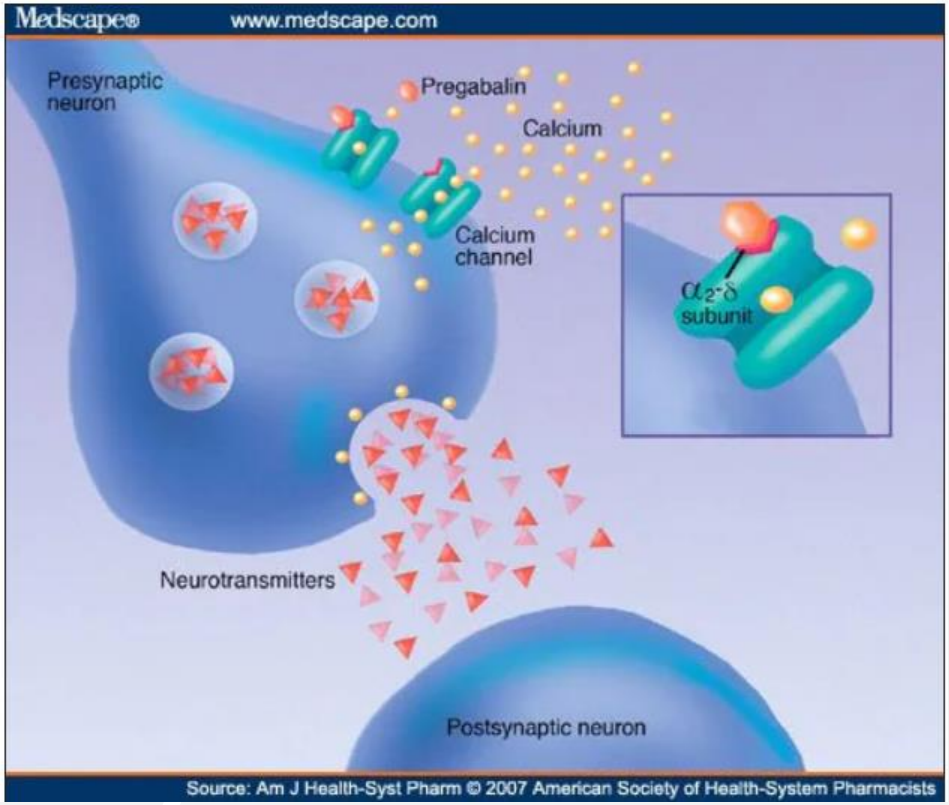
Dolor es inmunosupresor

Cirugía en si es muy inmunosupresora (NK, disminución de inmunidad célulomediada, disminución respuesta proliferativa de linfocitos y macrófagos)

Fentanilo: inmunosupresión dosis dependiente

Tramadol: aumenta actividad NK, y proliferación linfocitos

Invivo: la dosis y el momento de administración de opioides puede disminuir las consecuencias inmunodepresoras del dolor



GABAPENTINOIDES

PAIN® 155 (2014) 1909–1910

PAIN®

www.elsevier.com/locate/pain

Bridging the gaps: Special commentary

Gabapentin, a double-agent acting on cognition in pain? ☆

Therapeutic Advances in Drug Safety *Review*

Pregabalin: latest safety evidence and clinical implications for the management of neuropathic pain

Cory Toth

Ther Adv Drug Saf

2014, Vol. 5(1) 38–56

DOI: 10.1177/2042098613505614

NOTE *Surgery*

Gabapentin as an adjuvant for postoperative pain management in dogs undergoing mastectomy

Giulianne Carla CROCIOLLI[1)], Renata Navarro CASSU[1)]*, Rafael Cabral BARBERO[1)], Thalita Leone A ROCHA[1)], Denis Robson GOMES[1)] and Gabriel Montoro NICÁCIO[1)]

[1)]*Department of Veterinary Surgery and Anesthesiology, Faculty of Veterinary Medicine, Universidade do Oeste Paulista, Presidente Prudente, Brazil*

(Received 18 November 2014/Accepted 16 March 2015/Published online in J-STAGE 29 March 2015)

ABSTRACT. This study aimed to evaluate the analgesic efficacy of gabapentin as an adjuvant for postoperative pain management in dogs. Twenty dogs undergoing mastectomy were randomized to receive perioperative oral placebo or gabapentin (10 mg/kg). All dogs were premedicated with intramuscular acepromazine (0.03 mg/kg) and morphine (0.3 mg/ kg). Anesthesia was induced with propofol (4 mg/kg) intravenously and maintained with isoflurane. Intravenous meloxicam (0.2 mg/kg) was administered preoperatively. Postoperative analgesia was evaluated for 72 hr. Rescue analgesia was provided with intramuscular morphine (0.5 mg/kg). Dogs in the Placebo group received significantly more morphine doses than the Gabapentin group (P=0.021), despite no significant differences in pain scores. Perioperative gabapentin reduced the postoperative morphine requirements in dogs after mastectomy.

KEY WORDS: canine, gabapentin, morphine, multimodal analgesia

doi: 10.1292/jvms.14-0602; *J. Vet. Med. Sci.* 77(8): 1011–1015, 2015

GABAPENTINA

Dosis:

- Perro: 4 a10 mg.kg VO BID
- Gato: 5 mg.kg VO BID

Titulación:

- Aumentar dosis máxima de 50 mg.kg (2 a 3 mg.kg por dia)

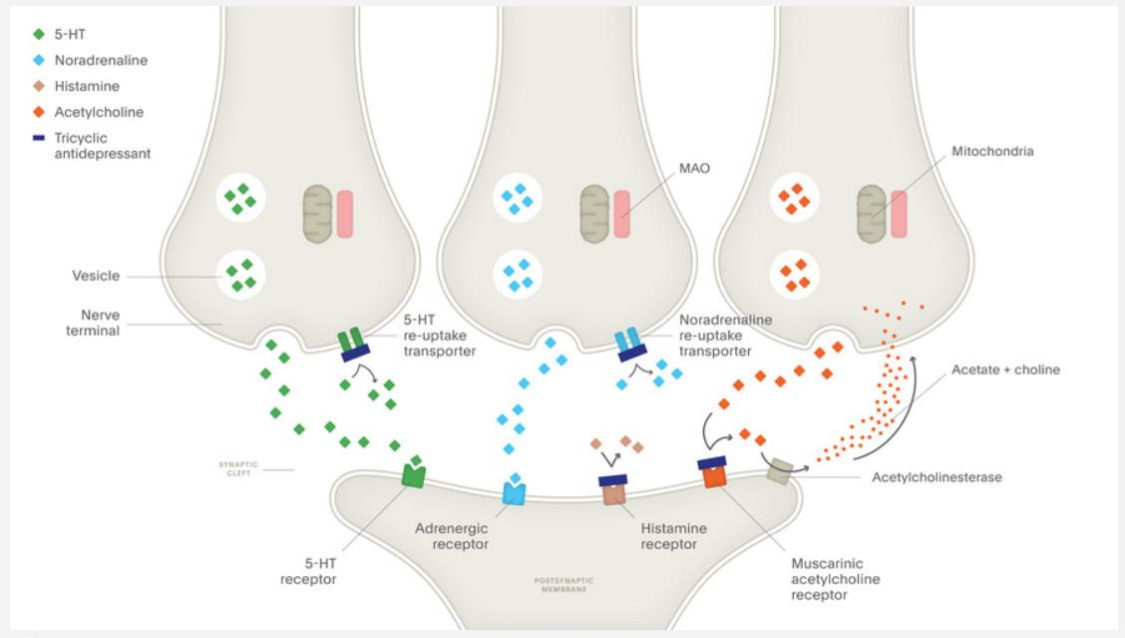
Efeitos indeseables:

- Sedación

Mecanismo de acción??? Posible bloqueo en canales de calcio de la membrana presinaptica

PREGABALINA

Perros y gatos: 1- 4 mg/kg BID



AMITRIPTILINA

MECANISMOS DE ACCIÓN DE AMITRIPTILINA

Modulación recaptación de norepinefrina y serotonina

Efectos directos/indirectos en receptores opioides

Antagonista NMDA

Inibición actividad canales ionicos

Review > Cancers (Basel). 2022 Jul 1;14(13):3248. doi: 10.3390/cancers14133248.

Antitumoral Effects of Tricyclic Antidepressants: Beyond Neuropathic Pain Treatment

Antonio Asensi-Cantó [1 2 3], María Dolores López-Abellán [1 3], Verónica Castillo-Guardiola [3], Ana María Hurtado [3 4], Mónica Martínez-Penella [1 2], Ginés Luengo-Gil [3], Pablo Conesa-Zamora [1 3]

Affiliations + expand

PMID: 35805019 PMCID: PMC9265090 DOI: 10.3390/cancers14133248

Free PMC article

AMITRIPTILINA

Dosis:

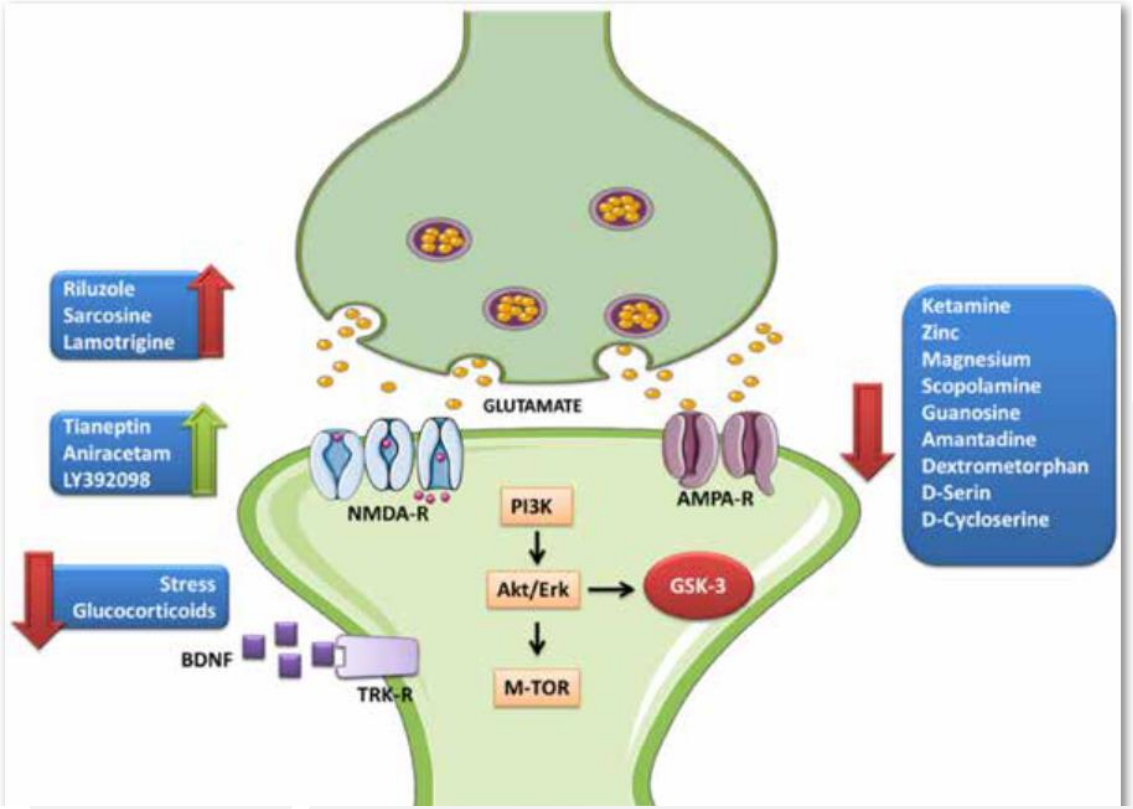
- Perro: 1 a 2 mg.kg VO SID/BID
- Gato: 2.5 a 12.5 mg.kg VO SID

Titulación:

- Aumentar hasta dosis máxima
- Efecto en 6 a 8 semanas

Efeitos indesejáveis:

- Sedación, vomito, disforia, anorexia, diarreia
- Arritmias (ECG antes)


Riluzole
Sarcosine
Lamotrigine
Tianeptin
Aniracetam
LY392098
Stress
Glucocorticoids
BDNF
TRK-R
GLUTAMATE
NMDA-R
AMPA-R
PI3K
Akt/Erk
GSK-3
M-TOR
Ketamine
Zinc
Magnesium
Scopolamine
Guanosine
Amantadine
Dextrometorphan
D-Serin
D-Cycloserine

AMANTADINA

AMANTADINA

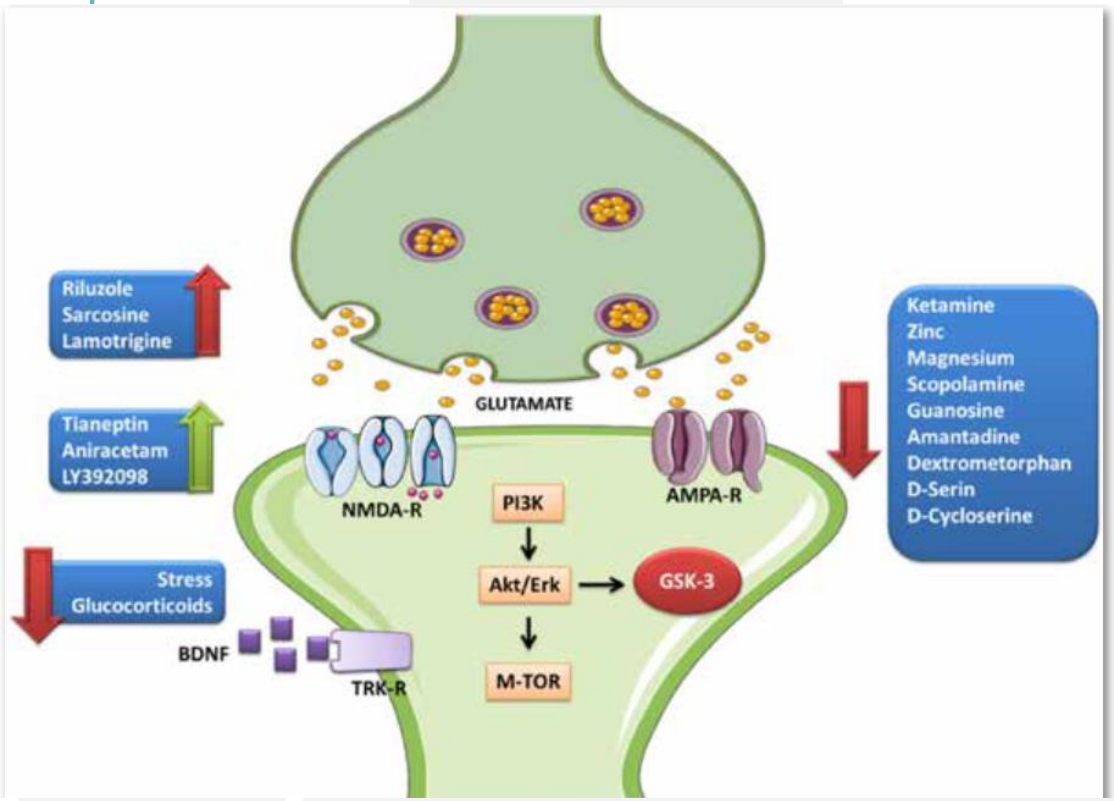
Dosis:

- Perro: 2 a 5 mg.kg VO SID
- Gato: 2 a 5 mg.kg VO SID

Efectos indeseables:

- Diarrea
- Disforia

Mecanismo de acción: antagonista receptores NMDA


Riluzole
Sarcosine
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GLUTAMATE
NMDA-R
AMPA-R
PI3K
Akt/Erk
GSK-3
M-TOR
Ketamine
Zinc
Magnesium
Scopolamine
Guanosine
Amantadine
Dextrometorphan
D-Serin
D-Cycloserine

KETAMINA

KETAMINA

Antagonista de receptor NMDA

Dosis analgésicas

- Inducción (0,5 mg.kg)
- Infusión (2-10 µg/kg/min)
- Pós-operatorio: 2 µg/kg/min

Table 1. Summary of Pharmacological Actions of Ketamine

Action	Potency	Reference
NMDA receptor block	Ki 0.4–46 μM	Fisher et al.[5]
	IC_{50} 1.6–6.2 μM	Chiz et al.[11]
Opioid receptors (ORs)		Smith et al.[24]
μ-ORs	Ki 27 μM	
δ-ORs	Ki 101 μM	
κ-ORs	Ki 85 μM	
Block of monoamine uptake		
Noradrenaline transporter	Ki 67 μM	Kohrs and Durieux[23]
Dopamine transporter	Ki 63 μM	
Serotonin transporter	Ki 162 μM	Nishimura et al.[25]
Receptors actions		
Block of muscarinic, nicotinic cholinergic receptors	IC_{50} 10–80 μM	Kohrs and Durieux[23]
Receptor binding		
Dopamine D_2	Ki 0.5 μM	
Serotonin 5-HT_2	Ki 15 μM	Kapur and Seeman[26]
Ion channels		
Block of Na^+, Ca^{2+} channels	Ki >50 μM or >100 μM	Eide et al.[20]
		Hirota and Lambert[21]
Block of Na^+, voltage-gated K^+ channels	IC_{50} 130–270 μM	Meller[22]
Block of Ca^{2+}-activated K^+ channels	100 μM	Schnoebel et al.[27]
		Hayashi et al.[28]
Functional effects		
Decreased activation, migration of microglia	100 μM	Hayashi et al.[28]
Inhibition of production of inflammatory mediators	≥ 2 μM, ≥ 50 μM, ≥100 μM depending on mediator and test system	DeKoch and Loix[41]
		See also Liu et al.[40]

Ki refers to binding studies, IC_{50} to functional effects. See references for further details.

Box 3
A practical approach to ketamine infusion in clinical practice.

- 60 mg of ketamine (0.6 mL of ketamine 10%) can be mixed in 0.5 L of a crystalloid solution. The patient will receive an infusion of 10 μg/kg/min if the infusion is administered at 5 mL/kg/h in the intraoperative period.
- Concentrations and doses should be adjusted in the perioperative period according to fluid therapy rates.

Box 4
The most important features of ketamine and its clinical use

- Ketamine is an NMDA antagonist used for the prevention and treatment of maladaptive pain.
- Dosage regimens usually consist of administering a loading dose (0.15–0.7 mg/kg), followed by variable infusion rates (2–10 μg/kg/min).
- Ketamine is often administered in the perioperative period by the intravenous route, and in combination with opioids, local anesthetic blocks, and nonsteroidal antiinflammatory drugs (ie, multimodal analgesia).

Ruel & Steagall, 2019

Box 6
The use of lidocaine-ketamine-dexmedetomidine in dogs

- A loading dose (2 mg/kg) of lidocaine followed by a CRI of 100 μg/kg/min, a loading dose (1 mg/kg) of ketamine followed by a CRI of 40 μg/kg/min, and a loading dose (1 μg/kg) of dexmedetomidine followed by a CRI of 3 μg/kg/h is used.
- Boluses should be administered slowly (eg, over 60 seconds). They could be either administered before or after induction of anesthesia. The administration before induction of anesthesia may reduce the requirements of injectable anesthetics.
- Volatile anesthetic concentrations should be reduced on a case-by-case basis. Veterinarians should expect a sparing effect of 50% to 60% but could be much more profound in dogs that are sensitive to α_2-adrenoreceptor agonists or in critical condition.
- The technique has not been studied in cats, and these patients may react differently to this drug combination. For this reason, the authors do not recommend this technique in cats until further studies are performed.

Ruel & Steagall, 2019

Randomized Controlled Trial > Int J Clin Pract. 2021 Dec;75(12):e15010. doi: 10.1111/ijcp.15010. Epub 2021 Nov 29.

The effect of low-dose ketamine on postoperative quality of recovery in patients undergoing breast cancer surgery: A randomised, placebo-controlled trial

Zijian Zhao [1 2], Qiqi Xu [2 3], Yao Chen [1], Chen Liu [1], Fangfang Zhang [1], Yuan Han [4], Junli Cao [1]

Affiliations + expand

PMID: 34807494 DOI: 10.1111/ijcp.15010

> Pain Res Manag. 2021 Nov 17;2021:3290289. doi: 10.1155/2021/3290289. eCollection 2021.

Prevention of Acute Postoperative Pain in Breast Cancer: A Comparison between Opioids versus Ketamine in the Intraoperatory Analgesia

Mirian López [1], María Luz Padilla [1], Blas García [1], Javier Orozco [1], Ana María Rodilla [2]

Affiliations + expand

PMID: 34840635 PMCID: PMC8612786 DOI: 10.1155/2021/3290289

Free PMC article

> Pediatr Blood Cancer. 2022 Sep;69(9):e29693. doi: 10.1002/pbc.29693. Epub 2022 Apr 4.

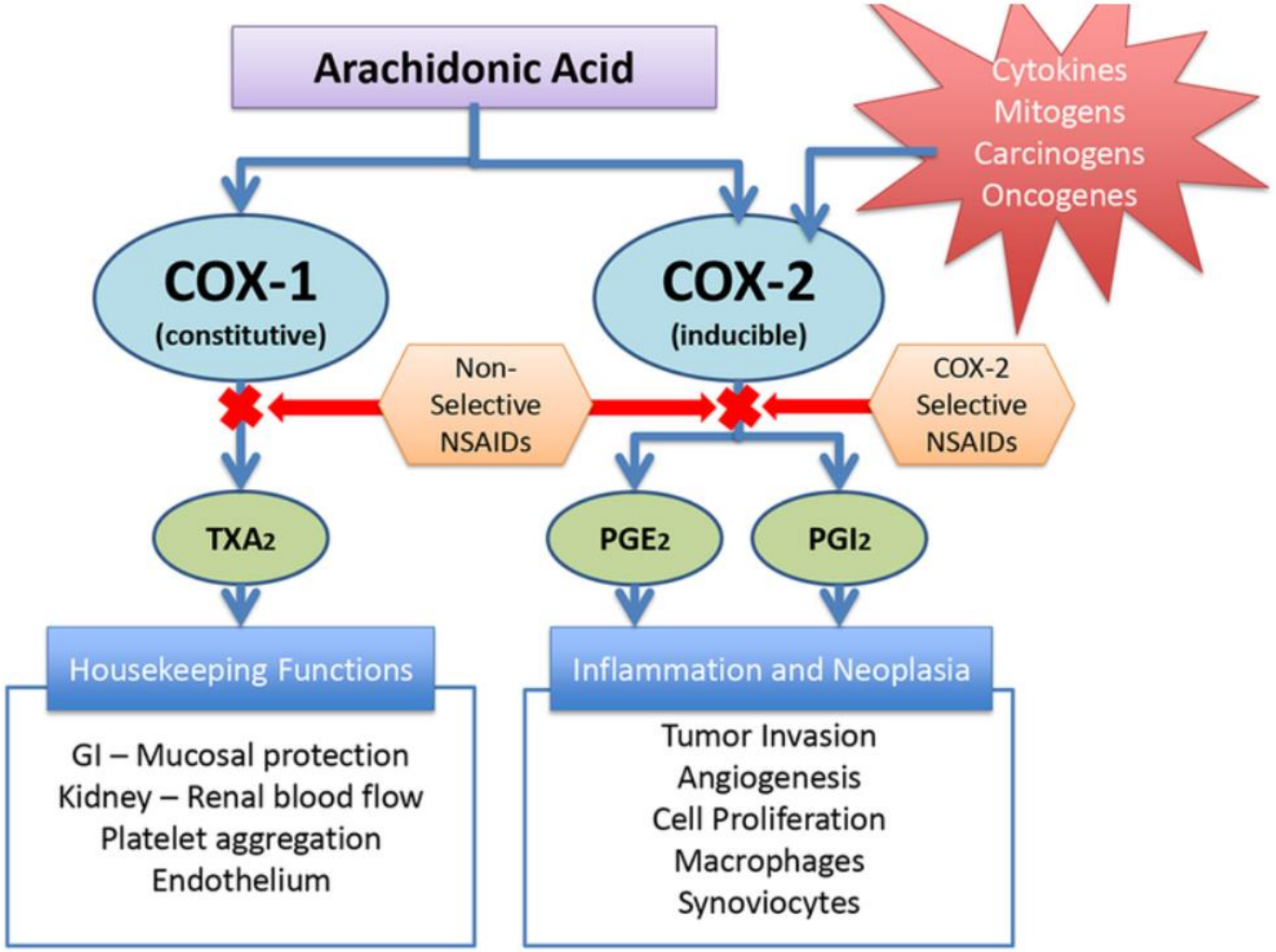
Low-dose ketamine infusions reduce opioid use in pediatric and young adult oncology patients

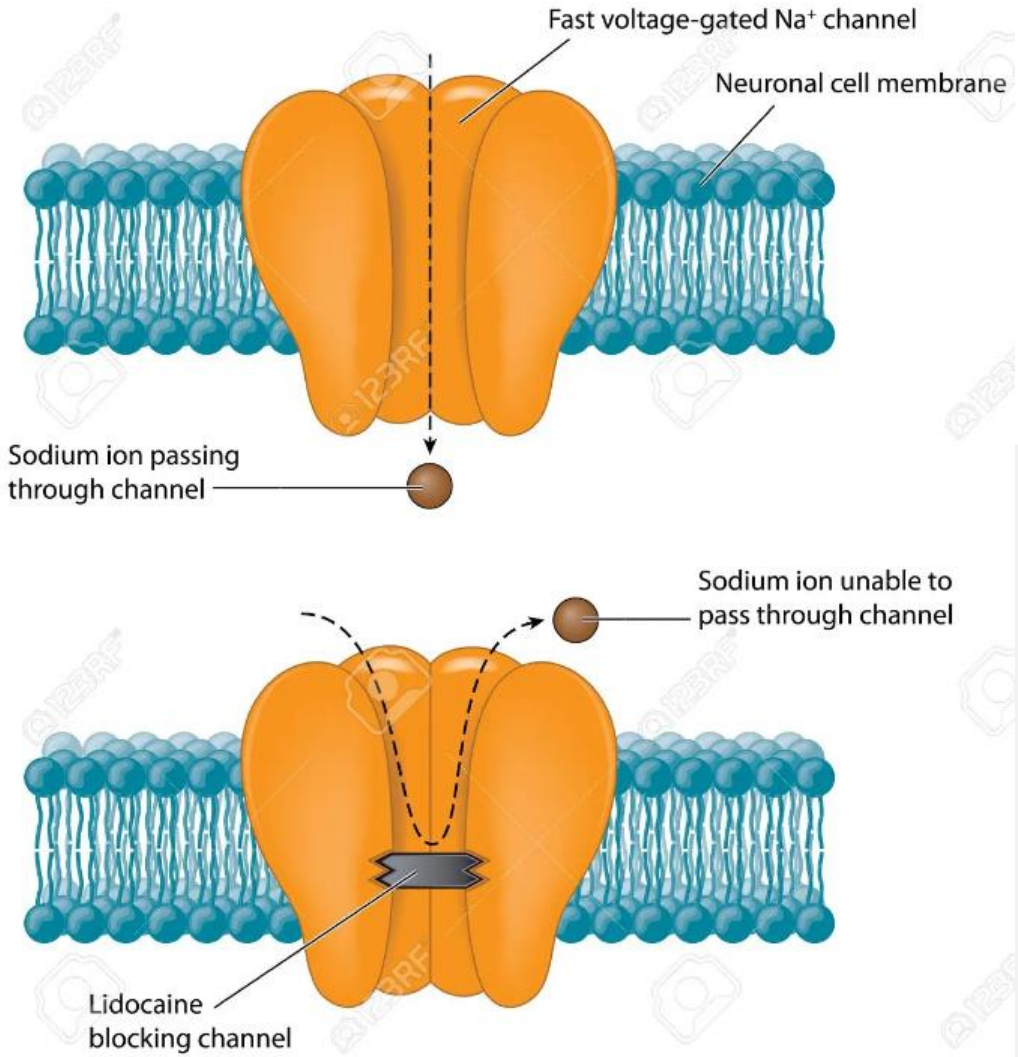
Doralina L Anghelescu [1], Stephanie Ryan [1 2], Diana Wu [1], Kyle J Morgan [1], Tushar Patni [1], Yimei Li [1]

Affiliations + expand

PMID: 35373875 PMCID: PMC9329174 (available on 2023-09-01) DOI: 10.1002/pbc.29693

AINES


Arachidonic Acid
Cytokines
Mitogens
Carcinogens
Oncogenes
COX-1
(constitutive)
COX-2
(inducible)
Non-
Selective
NSAIDs
COX-2
Selective
NSAIDs
TXA2
PGE2
PGI2
Housekeeping Functions
GI – Mucosal protection
Kidney – Renal blood flow
Platelet aggregation
Endothelium
Inflammation and Neoplasia
Tumor Invasion
Angiogenesis
Cell Proliferation
Macrophages
Synoviocytes



ANESTÉSICOS LOCALES

Review > J Transl Med. 2018 Jan 18;16(1):8. doi: 10.1186/s12967-018-1389-7.

Effects of surgery and anesthetic choice on immunosuppression and cancer recurrence

Ryungsa Kim [1]

Affiliations + expand

PMID: 29347949 PMCID: PMC5774104 DOI: 10.1186/s12967-018-1389-7

Free PMC article

Conclusion: Local anesthetics such as lidocaine increase NK cell activity. Anesthetics such as propofol and locoregional anesthesia, which decrease surgery-induced neuroendocrine responses through HPA-axis and SNS suppression, may cause less immunosuppression and recurrence of certain types of cancer compared to volatile anesthetics and opioids.

Posicionamento do Colégio Brasileiro de Anestesiologia Veterinária (CBAV) sobre a relação entre câncer e anestesia*

Recentemente vêm se alardeando nas mídias sociais que a "anestesia inalatória causa câncer". Tendo em vista que a propagação de informações fora de contexto pode alcançar o público em geral, resultando em intepretações equivocadas e questionamentos pelos responsáveis e tutores de animais, o Colégio Brasileiro de Anestesiologia Veterinária (CBAV) vem a público esclarecer a relação potencial entre a anestesia inalatória e o câncer por meio de respostas a quatro questões essenciais:

1) A anestesia inalatória causa câncer?

Inúmeras pesquisas na área médica vêm investigando a possível influência da anestesia inalatória no risco de recorrência de metástases no pós-operatório de cirurgia oncológicas (Lai et al. 2019; Yoo et al. 2019; Yap et al 2019; Hasselager et al. 2020; Hong et al. 2020). Entretanto, não há evidência científica estabelecendo uma relação de causa e efeito entre a anestesia inalatória e a ocorrência de câncer. Portanto, não se pode afirmar que "a anestesia inalatória causa câncer".

5) Conclusões:

A técnica anestésica deve minimizar o estresse peri-operatório e otimizar a recuperação do paciente do procedimento anestésico/cirúrgico. A cirurgia oncológica, em função da sua extensão/grau de invasividade, frequentemente demanda que os animais estejam sob anestesia geral. Entretanto, a escolha entre anestesia intravenosa ou inalatória não pode ser guiada pelo risco de recorrência do tumor. Além de outras técnicas analgésicas (exemplos: PIVA, anti-inflamatórios não-esteroides), deve-se considerar o uso de bloqueios loco-regionais associados à anestesia geral em uma técnica anestésica balanceada para animais com câncer.

J Am Vet Med Assoc. 2022 Sep 15;1-9. doi: 10.2460/javma.22.08.0354. Online ahead of print.

Development of Enhanced Recovery After Surgery (ERAS) protocols in veterinary medicine through a one-health approach: the role of anesthesia and locoregional techniques

Luis Campoy

PMID: 36108100 DOI: 10.2460/javma.22.08.0354

ANESTÉSICOS LOCALES

Inhiben propagación de células tumorales

Lidocaina inhibe migración de células de adenocarcinoma pulmonar

Ropivacaina inhibe células adenocarcinoma colónico

Meserve et al., Best Practice & Research Clinical Anaesthesiology 28 (2014) 139e1

Received: 24 November 2021 | Revised: 10 February 2022 | Accepted: 25 February 2022

DOI: 10.1111/vco.12808

Veterinary and Comparative Oncology

WILEY

ORIGINAL ARTICLE

Intensity of perioperative analgesia but not pre-treatment pain is predictive of survival in dogs undergoing amputation plus chemotherapy for extremity osteosarcoma

Michael W. Nolan[1,2,3] | Olivia C. Uzan[4,5] | Noah A. Green[1] | Susan E. Lana[4,5] | B. Duncan X. Lascelles[1,2,3,6,7,8]

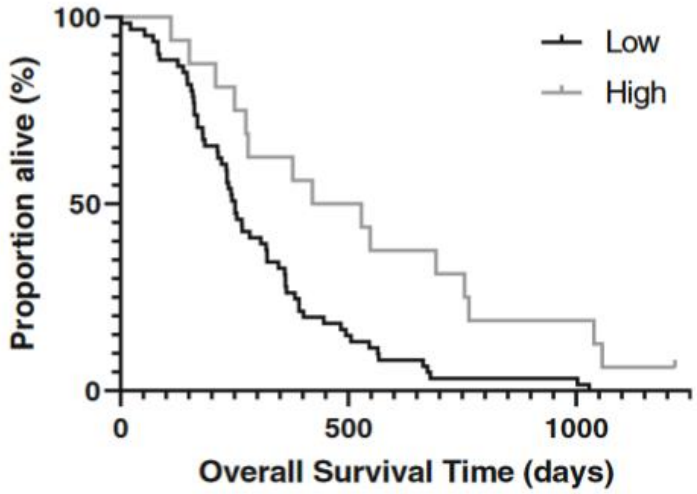


FIGURE 1 Kaplan–Meier graph of the overall survival time (OST) for dogs defined as having received a low ($n = 61$ dogs; median: 252 days; 95% confidence interval: 217–287 days) versus high ($n = 16$ dogs; median: 378 days; 95% confidence interval: 196–560 days) level of analgesic support in the time surrounding limb amputation (Log-Rank p value = .008)

- overall survival wasprolonged in dogs receiving what was defined as a high-intensity mul-timodal perioperative analgesic protocol.
- [NSAID] and a bupivacaine-eluting soaker catheter placed at the amputation site

WOUND SOAKER CATHETERS

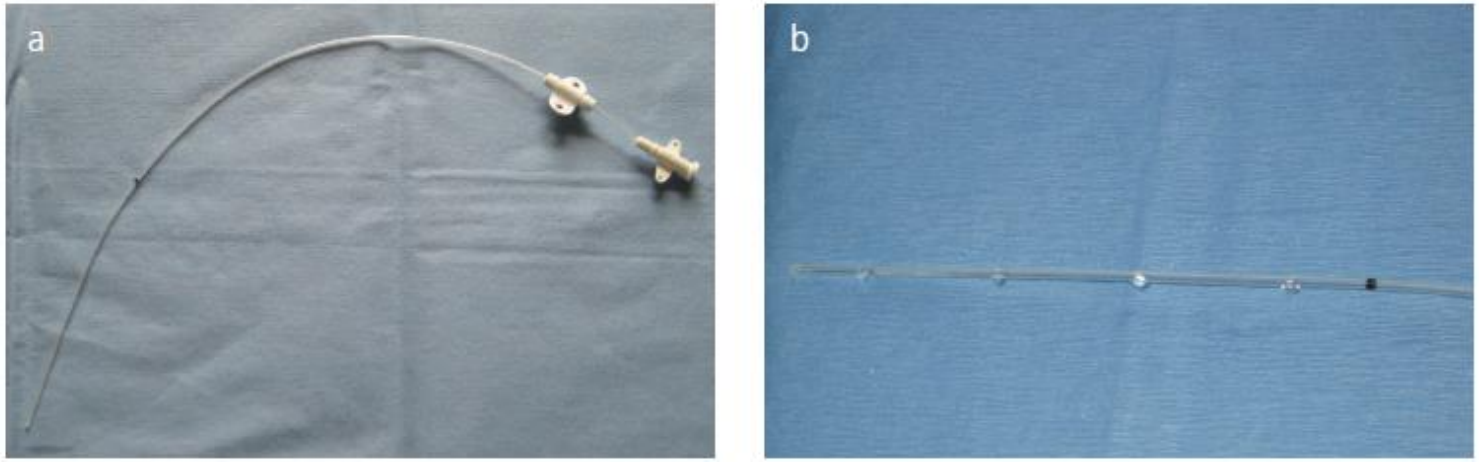


Fig 1: (a) A veterinary wound diffusion catheter, in this case a Mila diffusion catheter. (b) Dispersal of local anaesthetic droplets during drug injection

EXPAREL: New Postsurgical Pain Paradigm

EXPAREL, a liposome injection of bupivacaine, reduces the need for postsurgical opioids and devices

8 16 24 32 40 48 56 64 72 HOURS

EXPAREL (bupivacaine liposome injectable suspension)

EXPAREL®

(bupivacaine liposome injectable suspension)

1.3%

266 mg/20 mL (13.3 mg/mL)

For Infiltration Only. Not for Any Other Route of Administration

WAC cost per vial:
$285

9

PACIRA PHARMACEUTICALS, INC.

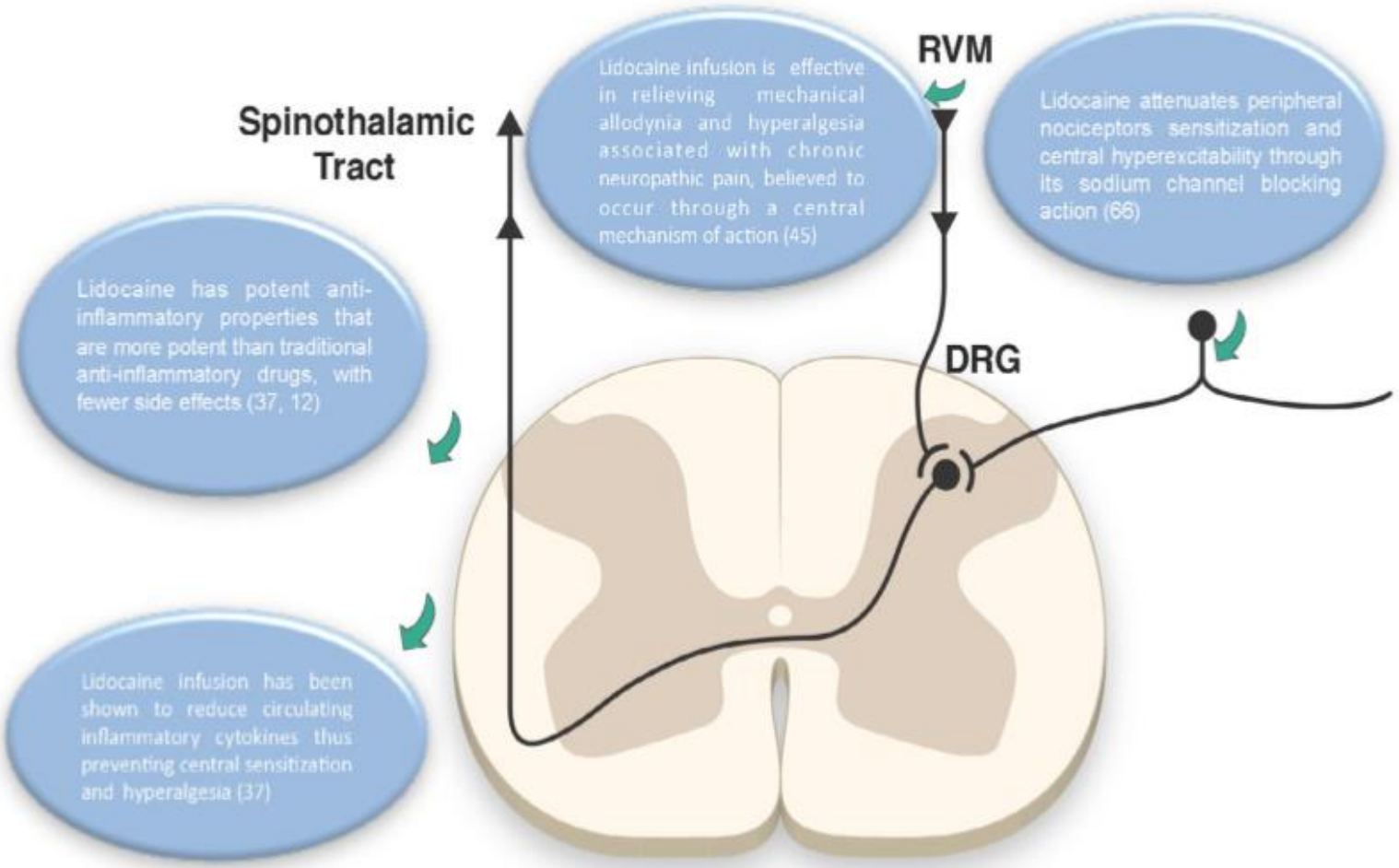
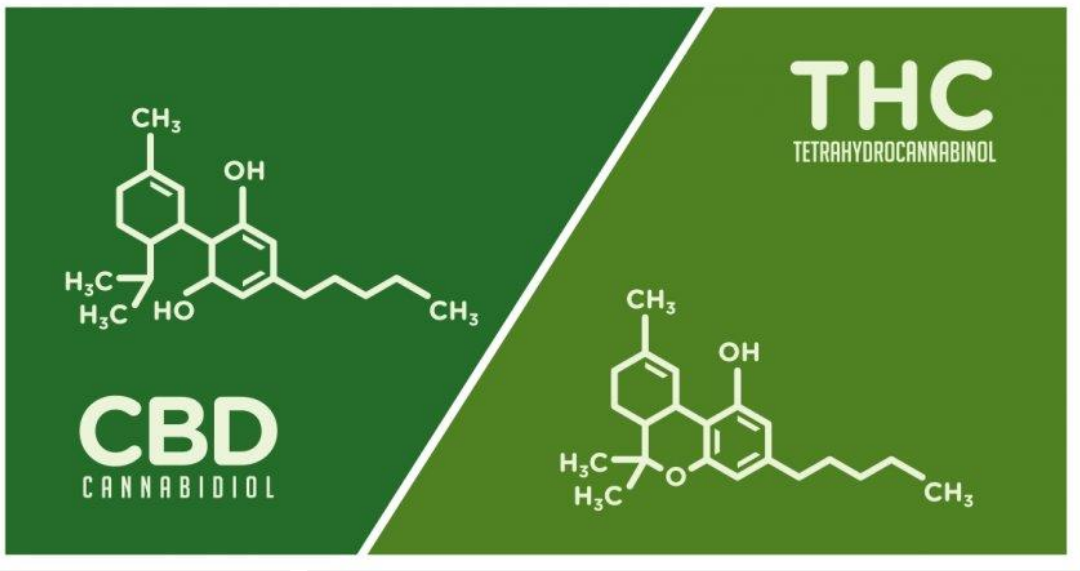
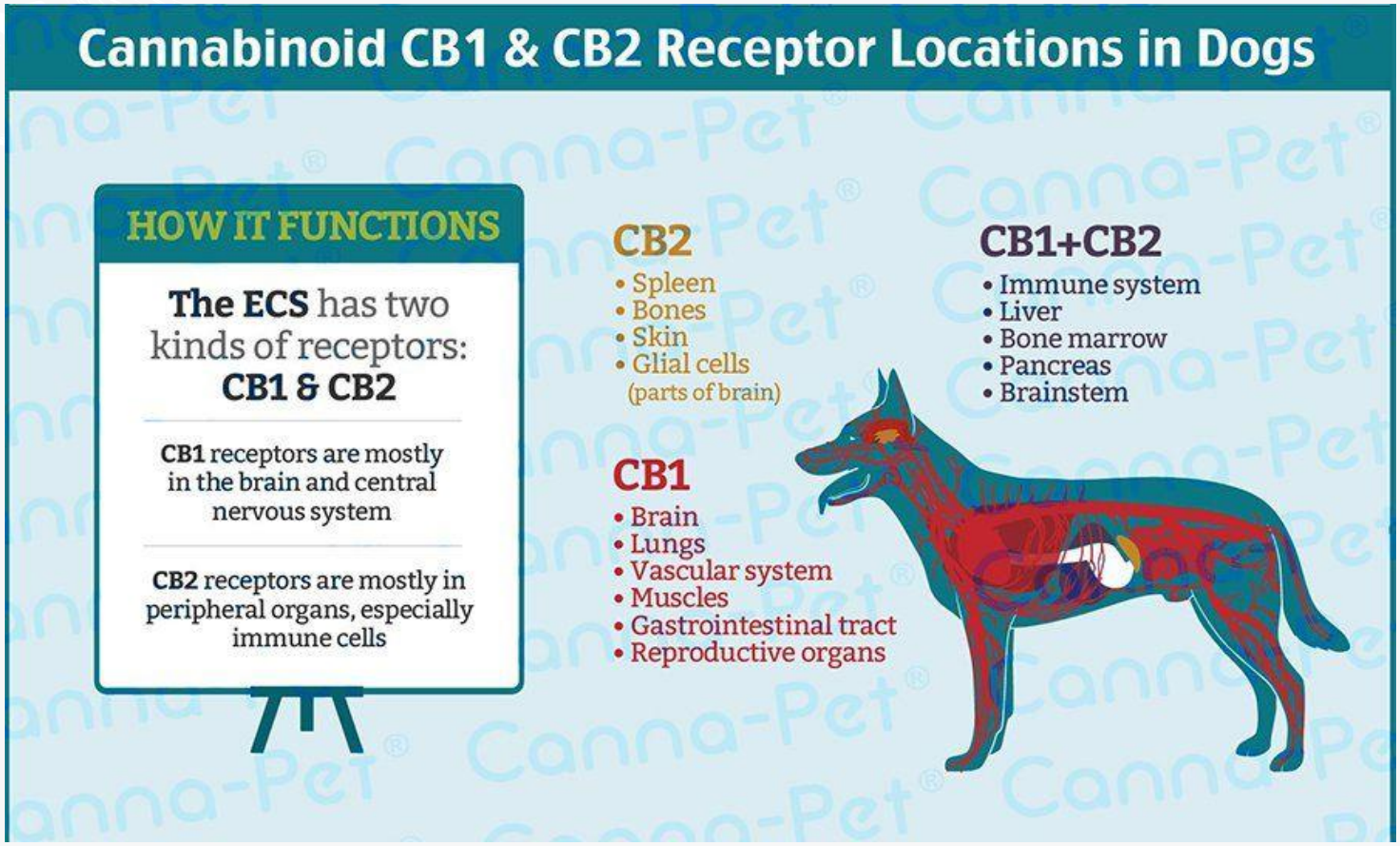


Figure 2.
Role of lidocaine in prevention of central sensitization.

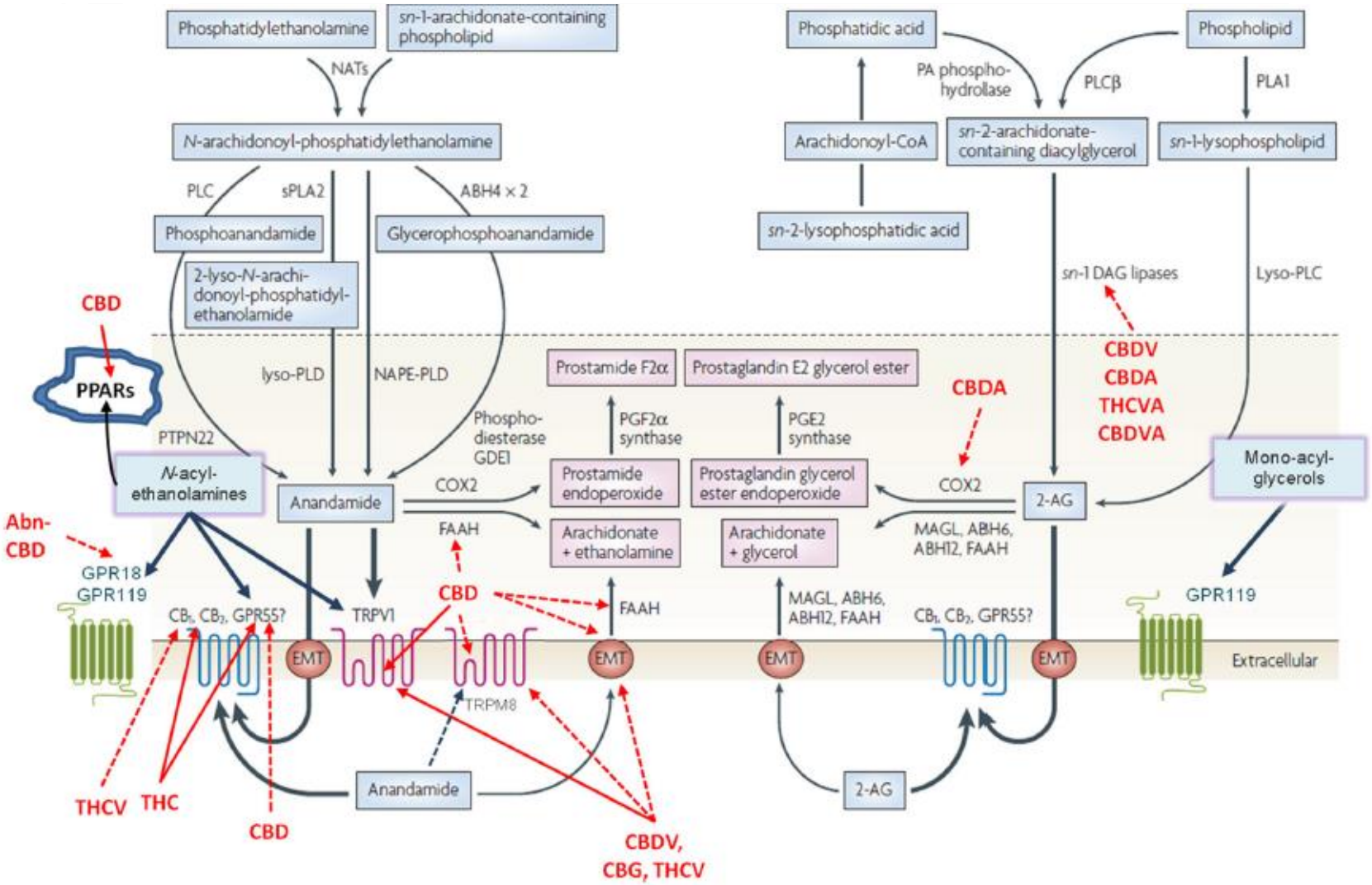


CANNABIS



Fuente: https://canna-pet.com/

Sistema Endocannabinoide



Uso Medicinal Cannabis

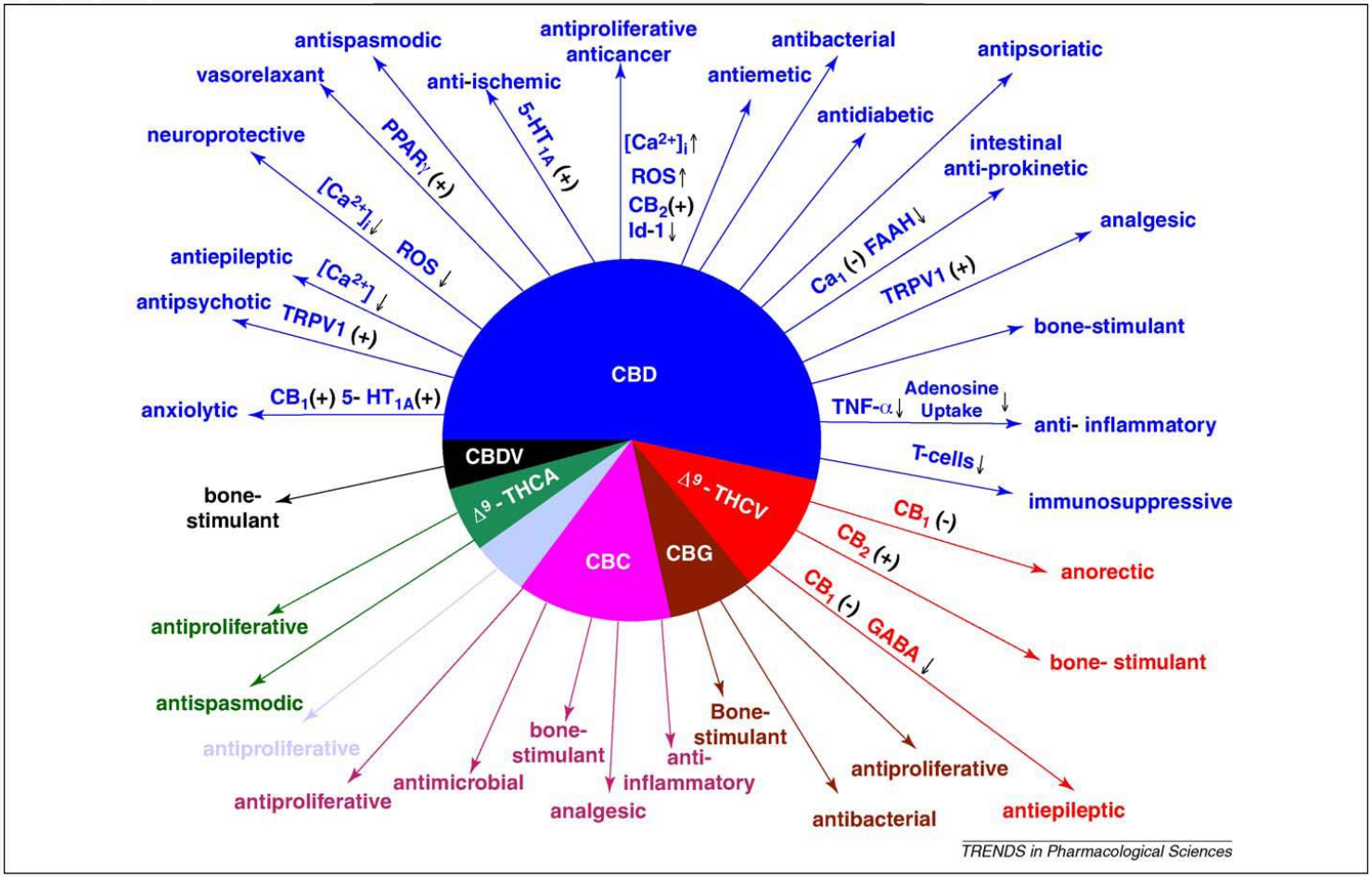


Figure 3: Antineoplastic effects of cannabinoids, examples.

3A: Pre-clinical effects of cannabinoids on select oncogenic pathways

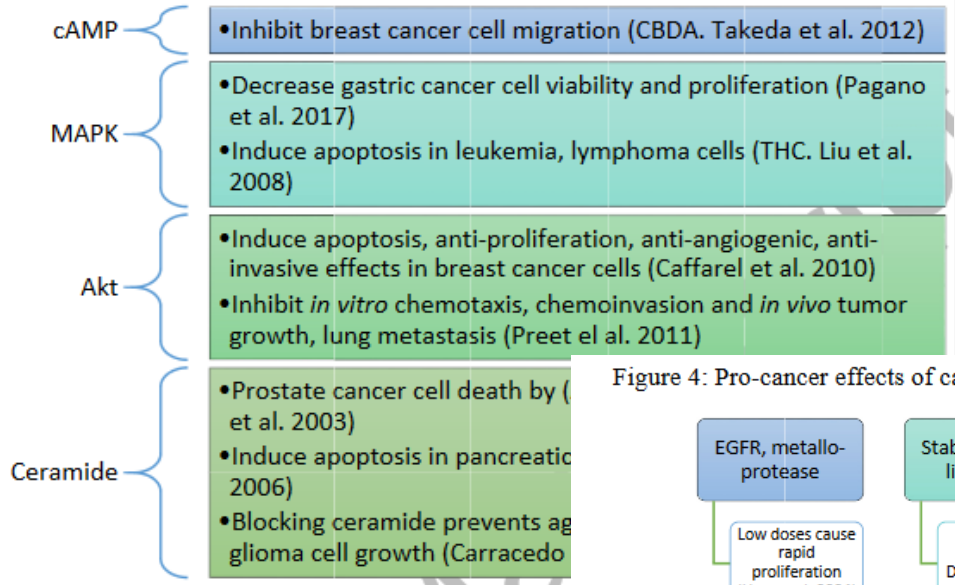
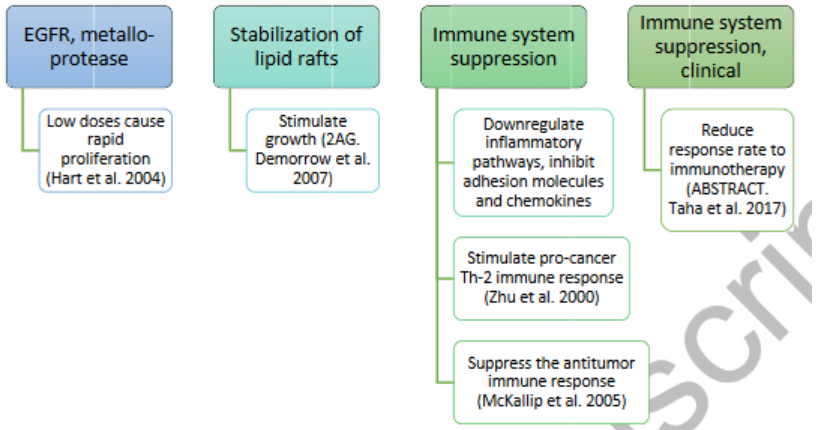


Figure 4: Pro-cancer effects of cannabinoids, examples.



J Natl Cancer Inst Monogr. 2021 Nov 28;2021(58):68-77. doi: 10.1093/jncimonographs/lgab012.

Cannabis and the Cancer Patient

Ilana M Braun [1 2], Donald I Abrams [3], Stacey E Blansky [4], Steven A Pergam [5 6 7]

Affiliations + expand

PMID: 34850899 DOI: 10.1093/jncimonographs/lgab012

Between December 15 and 20, 2020, the National Cancer Institute (NCI) held a first-ever 4-day conference on the role cannabis and cannabinoids play in oncology care.

Benefits of Cannabis Use for the Cancer Patient

Individuals with cancer may be confronted with a constellation of symptoms that include nausea and vomiting, loss of appetite, pain, anxiety, depression, and insomnia. When used with the awareness of one's oncologic treatment team, medicinal cannabis may serve as a parsimonious intervention with potential to alleviate all those symptoms as opposed to the prescribing of multiple medications that may interact with each other or with the individual's systemic cancer therapy.

Randomized Controlled Trial > Support Care Cancer. 2021 Dec;29(12):7471-7478.
doi: 10.1007/s00520-021-06301-x. Epub 2021 Jun 4.

A randomized trial of medical cannabis in patients with stage IV cancers to assess feasibility, dose requirements, impact on pain and opioid use, safety, and overall patient satisfaction

Dylan M Zylla [1], Justin Eklund [2], Grace Gilmore [2], Alissa Gavenda [2], Jordan Guggisberg [2], Gabriela VazquezBenitez [3], Pamala A Pawloski [3], Tom Arneson [4], Sara Richter [5], Angela K Birnbaum [6], Stephen Dahmer [7 8], Matthew Tracy [9], Arkadiusz Dudek [2]

Affiliations + expand

PMID: 34085149 DOI: 10.1007/s00520-021-06301-x

THC sintético

The Journal of Pain, Vol 9, No 3 (March), 2008: pp 254-264
Available online at www.sciencedirect.com

ELSEVIER

Efficacy of Dronabinol as an Adjuvant Treatment for Chronic Pain Patients on Opioid Therapy

Sanjeet Narang,* Daniel Gibson,* Ajay D. Wasan,*,† Edgar L. Ross,* Edward Michna,* Srdjan S. Nedeljkovic,* and Robert N. Jamison*,†

**Department of Anesthesiology, Perioperative, and Pain Medicine and †Department of Psychiatry, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts.*

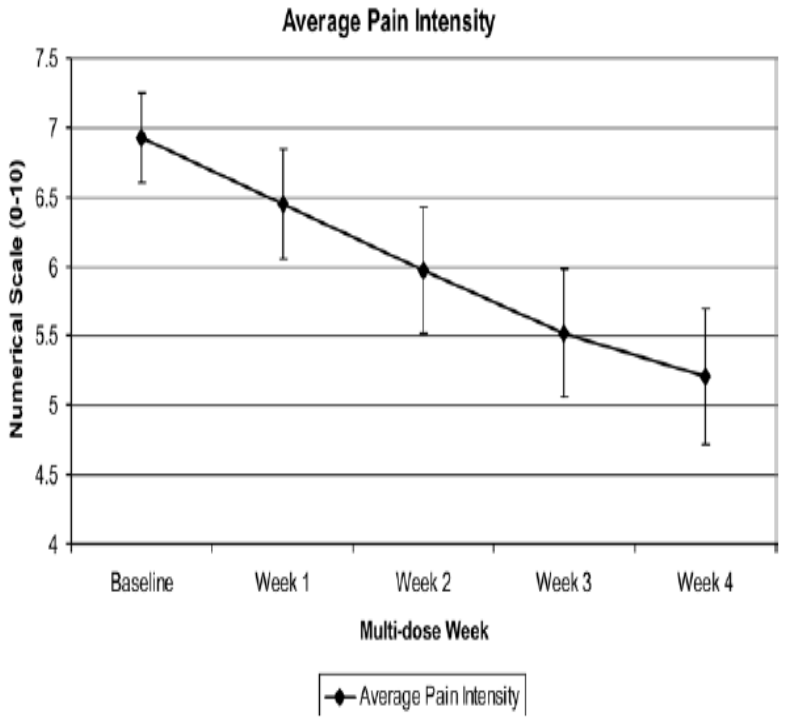


Figure 5. Average pain intensity ratings and standard error of measurement over the course of the 4-week open-label trial of dronabinol (Phase II trial).

Original Article

Multicenter, Double-Blind, Randomized, Placebo-Controlled, Parallel-Group Study of the Efficacy, Safety, and Tolerability of THC:CBD Extract and THC Extract in Patients with Intractable Cancer-Related Pain

Jeremy R. Johnson, MB ChB, Mary Burnell-Nugent, MB BChir, Dominique Lossignol, MB ChB, MRCG, DRCOG, Elena Doina Ganae-Motan, MD, Richard Potts, BSc (Hons), MICR, and Marie T. Fallon, MB ChB, MD, FRCP (E), FRCP (Glasg)

Severn Hospice (J.R.J.), Shrewsbury, Shropshire, and St. Luke's Hospice (M.B.-N.), Turnchapel, Plymouth, United Kingdom; Association Hospitaliere De Brussels (D.L.), Centre des Tumeurs de l'ULB, Brussels, Belgium; Emergency Department (E.D.G.-M.), Hospital "Sf. Ioan cel Nou," Suceava, Romania; GW Pharma Ltd. (R.P.), Ely, Cambridgeshire; and Edinburgh Cancer Research Centre

Review > Anim Health Res Rev. 2022 Jun;23(1):25-38. doi: 10.1017/S1466252321000189.
Epub 2022 Jun 15.

Use of cannabis in the treatment of animals: a systematic review of randomized clinical trials

Tácio de Mendonça Lima [1], Nathania Rodrigues Santiago [2], Elaine Cristina Ramos Alves [3], Douglas Siqueira de Almeida Chaves [1], Marília Berlofa Visacri [4]

Affiliations + expand

PMID: 35703023 DOI: 10.1017/S1466252321000189

Therefore, there was some evidence to support the use of CBD in dogs with osteoarthritis to reduce pain and increased activity, but limited evidence against epilepsy and behavioral problems.

In addition, CBD was well tolerated with mild adverse effects.

More RCTs with high quality of evidence are needed, including greater numbers of animal subjects, additional species, and clear readout measures to confirm these findings.

animals

MDPI

Article

Oral Transmucosal Cannabidiol Oil Formulation as Part of a Multimodal Analgesic Regimen: Effects on Pain Relief and Quality of Life Improvement in Dogs Affected by Spontaneous Osteoarthritis

Federica Alessandra Brioschi [1], Federica Di Cesare [2], Daniela Gioeni [1], Vanessa Rabbogliatti [3], Francesco Ferrari [3], Elisa Silvia D'Urso [4], Martina Amari [3] and Giuliano Ravasio [1,*]

Table 2. Breed, age, weight, gender and analgesic therapies administered to the dogs recruited in CBD (n = 9) and C (n = 12) groups. SID, once daily; BID, twice daily.

	Group	Breed	Age (months)	Weight (kg)	Gender	NSAIDs	Glucocorticoids	Gabapentin	Amitriptyline	CBD
1	CBD	Mongrel	156	23	Female	Firocoxib (5–1.25 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	2 mg kg^{-1} BID
2	CBD	Épagneul Breton	144	18	Female	None	Prednisone (0.5–0.12 mg kg^{-1} BID)	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	2 mg kg^{-1} BID
3	CBD	English Bulldog	96	25	Male	Firocoxib (5–2.5 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	2 mg kg^{-1} BID
4	CBD	Cane Corso	125	45	Female	Firocoxib (5–2.5 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	2 mg kg^{-1} BID
5	CBD	Labrador Retriever	110	45	Male	Firocoxib (5–1.25 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	2 mg kg^{-1} BID
6	CBD	Dogue de Bordeaux	84	60	Male	Firocoxib (5–1.25 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	2 mg kg^{-1} BID
7	CBD	Border Collie	156	20	Male	None	Prednisone (0.5–0.12 mg kg^{-1} BID)	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	2 mg kg^{-1} BID
8	CBD	Boxer	108	33	Male	Firocoxib (5–1.25 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	2 mg kg^{-1} BID
9	CBD	Boxer	108	40	Female	Firocoxib (5–1.25 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	2 mg kg^{-1} BID
1	C	Australian Sheperd	156	24	Male	Firocoxib (5–1.25 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
2	C	Labrador Retriever	152	41	Male	Firocoxib (5–1.25 mg kg^{-1} SID	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
3	C	Golden Retriever	173	29	Male	Firocoxib (5–2.5 mg kg^{-1} SID	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
4	C	Cocker Spaniel	167	13	Female	Firocoxib (5–2.5 mg kg^{-1} SID	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
5	C	Labrador Retriever	161	30	Female	Firocoxib (5–1.25 mg kg^{-1} SID	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
6	C	German Sheperd	115	25	Female	Firocoxib (5–1.25 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
7	C	Labrador Retriever	153	34	Male	None	Prednisone (0.5–0.12 mg kg^{-1} BID)	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
8	C	German Sheperd	108	25	Female	None	Prednisone (0.5–0.12 mg kg^{-1} BID)	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
9	C	Mongrel	180	10	Male	Firocoxib (5–2.5 mg kg^{-1} SID	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
10	C	Mongrel	127	22	Male	None	Prednisone (0.5–0.12 mg kg^{-1} BID)	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
11	C	English Bulldog	108	27	Female	Firocoxib (5–2.5 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None
12	C	Mongrel	182	18	Male	Firocoxib (5–1.25 mg kg^{-1} SID)	None	10–5 mg kg^{-1} BID	1 mg kg^{-1} SID	None

Consensus Recommendations on Dosing and Administration of Medical Cannabis to Treat Chronic Pain: Results of a Modified Delphi Process

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Global Task Force on Dosing and Administration of Medical Cannabis in Chronic Pain

ABSTRACT

Importance: Chronic pain affects close to two billion people worldwide. Globally, medical cannabis legalization has been increasing in recent years, and medical cannabis is commonly used to treat chronic pain. Medical cannabis has been associated with improved pain-related outcomes, increased quality of life, improved function and a reduced requirement for opioid analgesia. However, there are limited randomized control trials studying medical cannabis. As a result of this evidence gap, there are limited scientific data to guide dosing and administration of medical cannabis, which necessitates the demand for expert guidance on how to safely and effectively dose and administer medical cannabis.

Objective: Using a modified Delphi process, develop global expert consensus-based recommendations on how to safely and effectively dose and administer medical cannabis in patients with chronic pain.

Methods: We conducted a multistage modified Delphi process. An initial clinical practice survey was sent out to all 20 members of a global task force to gain an understanding of how patients are being treated with medical cannabis across different countries. A draft of consensus questions was developed and reviewed twice by a nine-member scientific committee before being sent out to all members for two rounds of pre-voting. A threshold of ≥75% agreement was predetermined for declaring consensus. Following the pre-voting, two virtual meetings were held to vote on the remaining key questions.

Results: There was consensus that medical cannabis may be considered for patients experiencing neuropathic, inflammatory, nociplastic and mixed pain. Three treatment protocols were developed and categorized as: routine, conservative and rapid. The routine protocol is recommended for the majority of patients. Conservative may be considered for the frail, elderly, and those with severe co-morbidity or polypharmacy. The rapid protocol is for those requiring urgent management of severe pain, palliation, and for those with significant prior use of cannabis. These protocols were established with the understanding that tailoring medical cannabis treatment to the individual is a critical component of successful treatment. If breakthrough pain management is necessary, dried flower vaporization was the recommended mode of administration.

Conclusions: This modified Delphi process led to expert consensus-based pragmatic recommendations on how to safely and effectively dose and administer medical cannabis for the treatment of patients with chronic pain.

CONTACT

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INTRODUCTION

- Chronic pain affects close to 2 billion people worldwide and is associated with impairment in physical and emotional function, reduced participation in social and vocational activities, and lower perceived quality of life.
- The number of countries where medical cannabis is approved has increased in recent years. In addition, it is common for physicians to be asked by patients for advice on how to use cannabis.
- Despite these clinical realities of increased use of medical cannabis, randomized control trials are lacking, resulting in an unmet need for expert guidance on using medical cannabis safely.
- The recommendations presented here were developed as practical guidance for clinicians who may have limited experience with prescribing medical cannabis.

METHODS AND MATERIALS

- A modified Delphi process to establish expert consensus-based recommendations on the dosage and administration of medical cannabis.
- A global task force of twenty individuals was recruited based on extensive clinical experience and/or high academic interest in prescribing and managing patients on medical cannabis for the treatment of chronic pain, while maintaining an acceptable safety profile.
- Several rounds of pre-voting were conducted prior to two virtual meetings that were held on the remaining key questions.

Figure 1. Global Task Force Geography

RESULTS

- Three protocols for oral dosing and administration of cannabinoids based on patient need were developed : Routine, Conservative, and Rapid (Figures 2-4).
- For each protocol, a starting cannabinoid type was voted on, followed by a titration protocol up to a maximum daily dose recommendation.
- The routine protocol is recommended for most patients. Conservative may be considered for the frail, elderly, and those with severe co-morbidity or polypharmacy. Rapid is for those requiring urgent management of severe pain, palliation, and significant prior use of cannabis.
- Chronic pain patients who were candidates for medical cannabis were also determined (Table 1).

Figure 2. Routine Dosing and Administration Protocol for Medical Cannabis

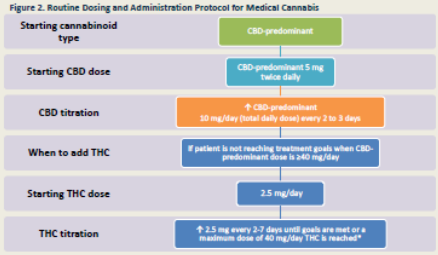
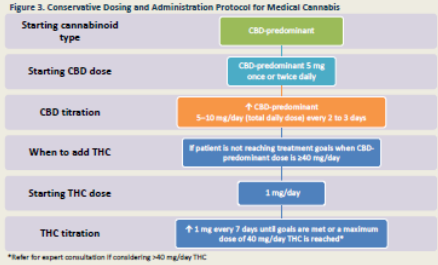


Figure 3. Conservative Dosing and Administration Protocol for Medical Cannabis



*Refer for expert consultation if considering >40 mg/day THC

Figure 4. Rapid Dosing and Administration Protocol for Medical Cannabis

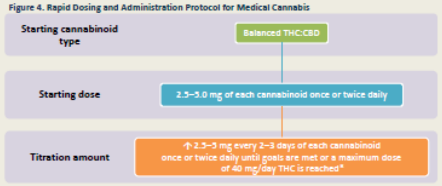


Table 1. Patients with Chronic Pain who are Candidates for Medical Cannabis

Types of pain	• Mixed pain • Neuropathic pain • Inflammatory pain • Nociplastic pain
Avoid medical cannabis	• Pregnant/breastfeeding women, people with psychotic disorders
Age	• THC – no consensus on minimum age (risk > benefit in under 25 years) • CBD – no minimum age • No maximum age for THC or CBD
Drug-drug interactions	• Caution with: • Anticoagulants • Immunotherapy • Clobazam
Dosage form	• Oral preferred for ease of dosing and safety

CONCLUSIONS

- Through a modified Delphi process it was possible to develop three practical protocols for the administration of medical cannabis to treat chronic pain.
- These recommendations may support clinicians and patients in achieving safe and effective dosing and administration of medical cannabis.
- Future studies are needed to confirm the validity and applicability of these protocols.

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Consensus recommendations on dosing and administration of medical cannabis to treat chronic pain: results of a modified Delphi process. J Cannabis Res 2021 Jul 2;3(1):22. doi: 10.1186/s42238-021-00073-1

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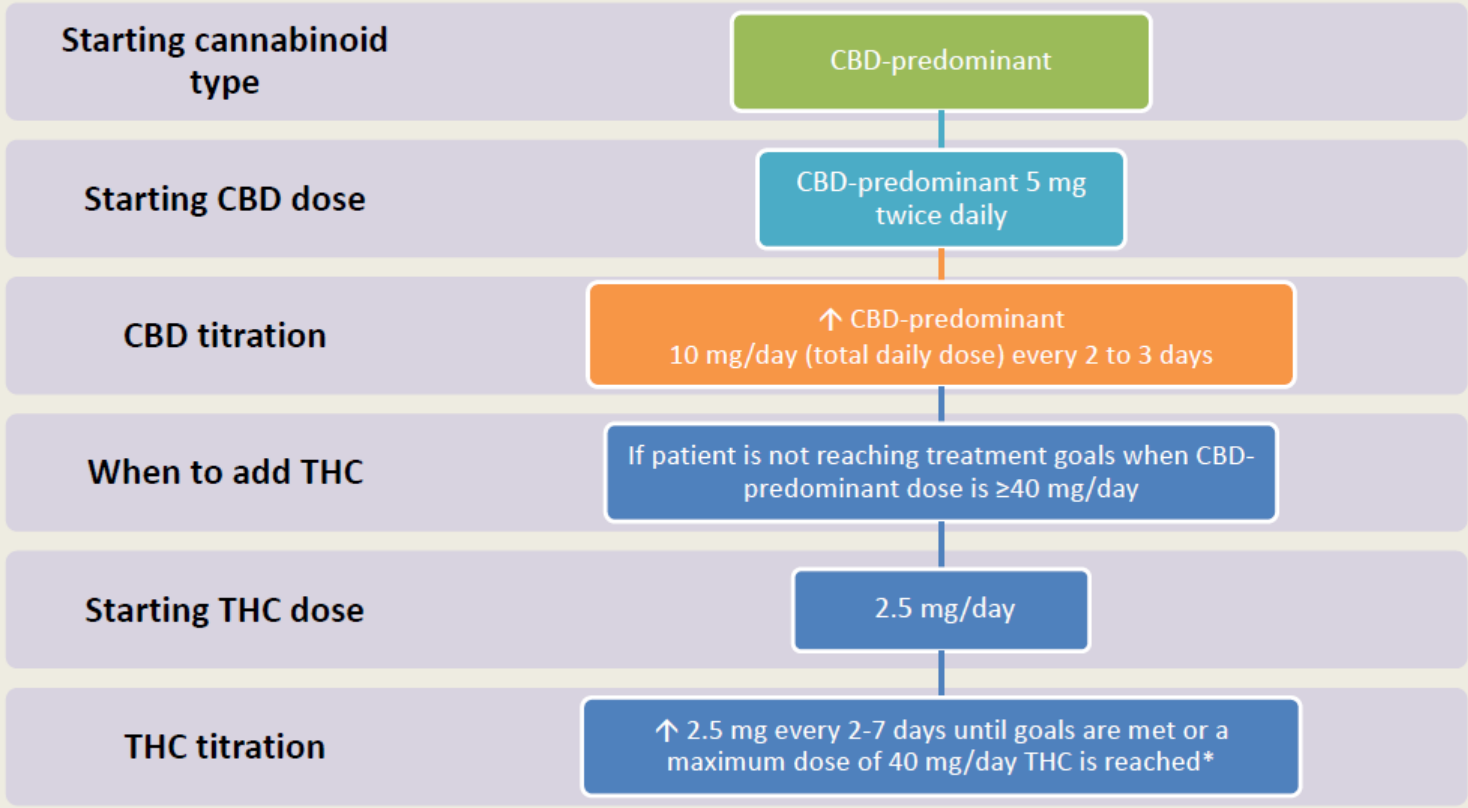

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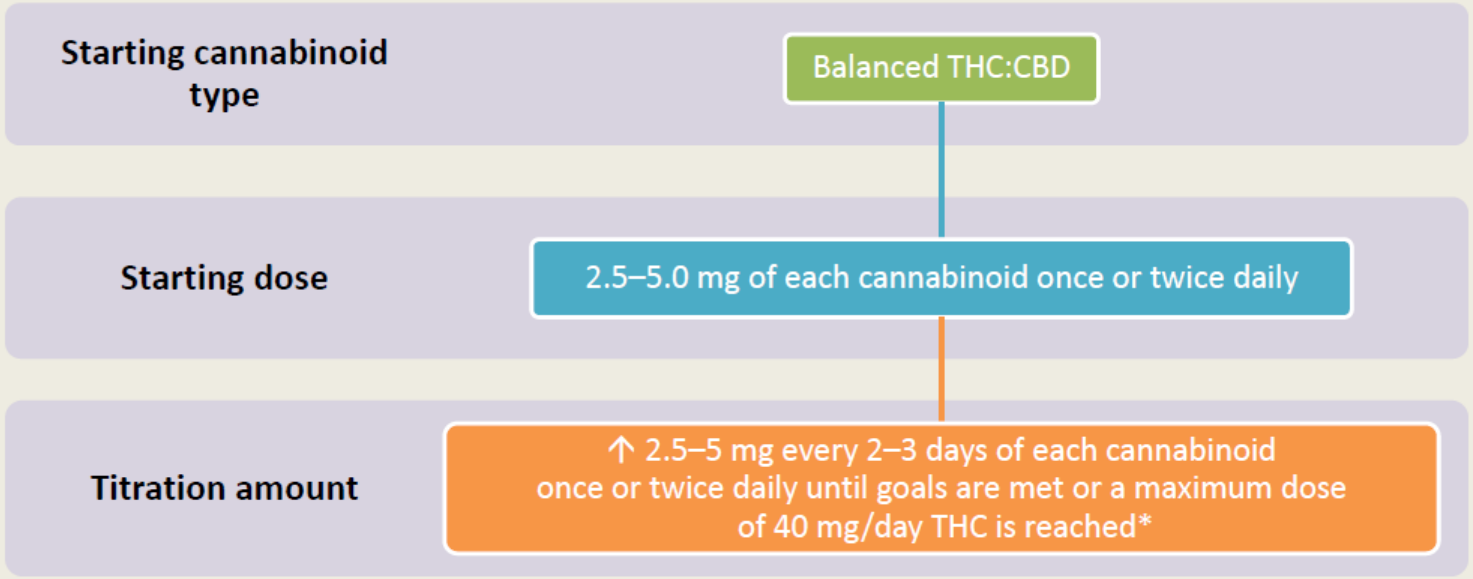

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	  • Immunotherapy
	  • Clobazam

Dosage form	• Oral preferred for ease of dosing and safety

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Effective Palliative Care: What Is Involved?

Mehak Swami, Amy Allen Case

PMID: 29684230

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Table 2. Palliative Care Skills and Services Provided by the Oncology Team

• Basic pain and symptom management (nausea, vomiting, constipation, anorexia, insomnia, etc).
• Basic management of depression and anxiety.
• Basic discussion about goals, prognosis, and suffering.
• Recognition of when patients may benefit from a spiritual or psychosocial assessment.
• Early introduction of available resources for patients and their caregivers at home (home-based palliative care services, early hospice referrals, or nursing services).

SPIKES Framework for Delivering Bad News

S: Setting. Invite all appropriate participants to the family meeting in a private, quiet environment. Sit at eye level.

P: Perception. Ask the patient and family about their understanding of the medical situation. Open-ended questions are helpful (eg, "What have you been told about your condition so far?")

I: Invitation or Information. How much information does the patient want? A "warning" question is helpful prior to delivering news (eg, "Is it all right if I review your medical status, including your prognosis?")

K: Knowledge. Inform the patient in simple, straightforward terms, and repeat any information to gauge his or her understanding. It is important to provide an estimated prognosis if the patient desires (eg, "I would not be surprised if you became much sicker in the next 6 months"). Give information in small doses and pause so the patient can process it. Offer to review what to expect as time goes on.

E: Empathy. Respond and reflect on emotions. Empathetic responses include observing the patient's response (tone, behavior, expression), identifying emotions, connecting with the reasons for them, and acknowledging the emotions verbally.[19] Avoid apologizing. Patients often feel supported by "I wish" statements (eg, "I see that you are upset; I wish you did not have to hear this today").

S: Summarize or Strategize. Plan for a follow-up, review the next steps, and establish goals of care (eg, "If time were running short, where would you want to be, and what would you want to be doing?") If they say they prefer to be home around their loved ones, make a recommendation to allow natural death ("do not resuscitate" and "do not intubate" orders) and review all that you would continue to do for them if they develop any symptoms that require intervention.

KEY POINTS

- An interdisciplinary palliative care team consists of physicians, nurses, social workers, psychologists, and chaplains who work together to provide symptom relief, pain management, and relief from psychosocial distress.
- Common palliative care principles that oncologists can adopt include improving symptom assessment and management; improving understanding of prognosis and delivering prognosis information with compassion and empathy; and recognizing that spiritual, psychosocial, and cultural elements play important roles in causing suffering for cancer patients.
- Referral to a specialized palliative care team is necessary for management of refractory pain and other symptoms; complex depression and anxiety; conflicts among family and/or healthcare teams; and questions related to home palliative care or hospice programs.
- Communication is a foundation of palliative care. Studies show that patients with chronic illness want to talk with their oncologist about their choices and goals of care, as well as have frank discussions about prognosis.


Illness
Body
Desires & Goals
Patient & Family
Mind
Daily Living
Social
Spiritual

Dra. Nadia Crosignani