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EMERGENCY & SPECIALTY CENTER

Cardiac Therapies

A Review for the Veterinary Technician

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About Me

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Learning Objectives

Identify common cardiac diseases seen in small animal practice.

Understand the mechanisms and uses of key cardiac drugs.

Describe technician roles in patient monitoring and client education.

Recognize interventional and surgical cardiac therapies.

Overview of Cardiac Disease in Veterinary Medicine

Common cardiac conditions in dogs and cats:

- Myxomatous Mitral Valve Disease (MMVD)
- Pulmonary Hypertension (PHT)
- Dilated Cardiomyopathy (DCM)
- Hypertrophic Cardiomyopathy (HCM)
- Congenital defects (e.g., PDA, VSD, ASD, AVSD, PS)

Importance of early detection and technician involvement





Overview of Cardiac Disease in Veterinary Medicine

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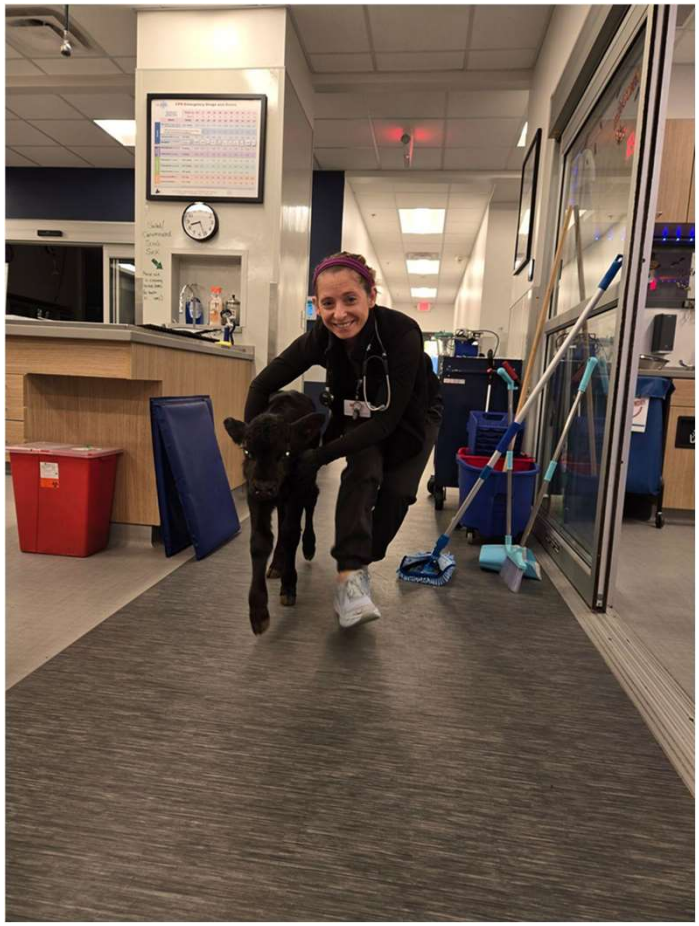
Overview of Cardiac Disease in Veterinary Medicine

Common cardiac conditions in dogs and cats:

- Congenital defects (e.g., PDA, VSD, ASD, AVSD, PS, TVD, SAS)

Role of the Veterinary Technician

- Obtaining accurate **patient histories** and **vital signs**
- Assisting with **diagnostics** (ECG, radiographs, echocardiograms, BP)
- **Medication administration & monitoring**
- **Client education** on disease management and home monitoring
- Providing **nursing care** for hospitalized cardiac patients



Pharmacologic Therapies: Overview

Goals: Improve cardiac output, reduce preload/afterload, control rhythm

Categories:

- **Inotropes**
- **Diuretics**
- **Vasodilators**
- **Antiarrhythmics**
- **Antithrombotics**

Pharmacologic Therapies: Inotropes

Categories:

1. **Inotropes**

a. **Pimobendan (Vetmedin)**
   i. Inodilator
      1. Positive inotrope – improves systolic (pump) function
      2. Vasodilator
   ii. Lowers left atrial pressures
   iii. Improves cardiac output
   iv. Oral medication only in US
   v. May cause arrhythmias – atrial or ventricular

Dobutamine: IV inotrope for acute CHF 2.5-15 mcg/kg/min

Pharmacologic Therapies: Diuretics

Categories:

2. Diuretics

Furosemide (Lasix, Salix)

Routes: IV, IM, SubQ, Oral

Uses: Acute & chronic heart failure

Mechanism: Loop diuretic – increases excretion of water, sodium, potassium, chloride, calcium, and more

Dose: Max effect at low doses

Side Effects: PU/PD, electrolyte loss, GI upset, ototoxicity

Precautions: Renal disease, dehydration, sulfonamide sensitivity

Pharmacologic Therapies: Diuretics cont.

Categories:

2. Diuretics

Torsemide (Demadex)

Route: Oral

Uses: Adjunct for chronic heart failure

Mechanism: Similar to furosemide, but 10–20× more potent

Dose: 0.1–0.3 mg/kg PO q24h (start at 5–10% of furosemide dose)

Side Effects & Precautions: Same as furosemide

Pharmacologic Therapies: Diuretics cont.

Categories:

2. Diuretics

Spironolactone (Aldactone)

Route: Oral

Uses: Chronic heart failure

Mechanism: Aldosterone antagonist – potassium-sparing

Dose: Dogs 1–2 mg/kg BID

Side Effects: GI upset, appetite loss, facial excoriations in cats

Precautions: Hyperkalemia risk, caution with ACE inhibitors

Pharmacologic Therapies: Diuretics cont.

Categories:

2. Diuretics

Hydrochlorothiazide (HydroDIURIL, Microzide)

Route: Oral

Uses: Adjunctive therapy

Mechanism: Thiazide diuretic – acts on distal tubules

Dose: Lowest effective dose

Side Effects: PU/PD, electrolyte loss, ototoxicity

Precautions: Renal disease, dehydration, sterile abscess risk with SubQ

Pharmacologic Therapies: Vasodilators

Categories:

3. Vasodilators

ACE Inhibitors

Enalapril (Enacard, Vasotec)

Benazepril (Lotensin, Fotekor)

Lisinopril (Zestril, Prinivil)

Routes of Administration: Oral

Primary uses : heart failure (chronic) hypertension, PLN

Dose: 0.25 – 0.5 mg/KG once to twice a day

Mechanism of Action: Block conversion of angiotensin to angiotensin II

Side Effects: Loss of appetite, weakness, lethargy, GI upset, Renal issues

Precautions: patients with renal disease or elevation in potassium levels, renal vs, hepatic excretion. monitor blood profiles

Pharmacologic Therapies: Vasodilators cont.

Categories:

3. Vasodilators

Amlodipine (Norvasc)

Primary use: Hypertension, chronic valve disease

Routes of Administration: oral

Dose:

Dogs 0.1-0.4 mg/kg twice a day

Cats 0.625-1.25 mg per cat once or twice a day

Mechanism of Action: Calcium Channel Blocker

Side Effects: Lethargy, weakness, appetite loss, rapid heart rate, gingival hyperplasia

Precautions: Other vasodilators, cutting tablets

Pharmacologic Therapies: PA Vasodilators

Categories:

3. Vasodilators

Sildenafil (Revatia, Viagra)

Primary use – Pulmonary artery hypertension

Routes of Administration: oral

Dose: 2-3 mg/kg every 8 hours

Mechanism of Action: inhibition of phosphodiesterase

Side Effects: no major SE noted

Precautions: concurrent vasodilators

Pharmacologic Therapies: Beta-blocker

Categories:

4. Antiarrhythmics

Atenolol (Tenormin) **Esmolol** (Brevibloc) **Carvedilol** (Coreg)

Routes of Administration: oral, IV

Primary uses: rapid heart rates, HCM, hypertension

Dose:

- atenolol
  - 0.25-1 mg/kg BID for dogs
  - 6.25-12.5 mg per cat once to twice a day
- esmolol 50-200 mcg/KG IV or CRI

Mechanism of Action: reduce effects of sympathetic stimulation

Side Effects: weakness, lethargy, low heart rates

Precautions: caution with low heart rates, congestive heart failure, asthma, titration of dosing

Pharmacologic Therapies: Sodium channel blocker

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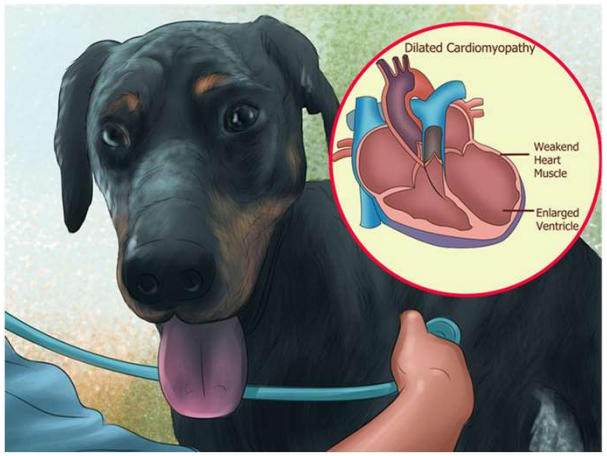


4. Antiarrhythmics

Lidocaine

Routes of Administration: IV

Dose: 2mg/kg IV bolus (up to 4) or 50-80 mcg/KG/min CRI

Mexiletine oral form: 5-8 mg/KG every 8 hours

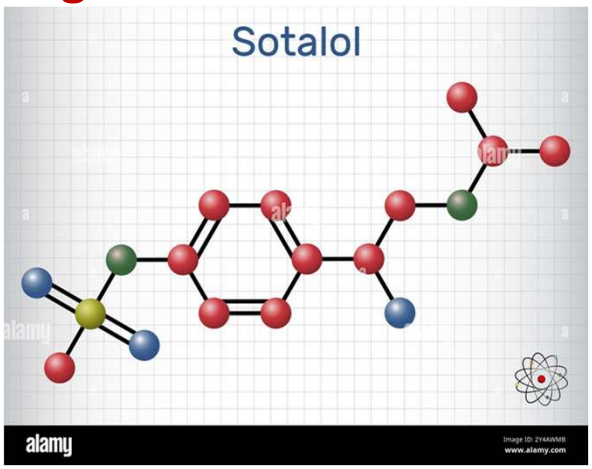
Mechanism of Action: blockade of sodium channels

Side Effects: Vomiting, flushing, seizure, muscle tremors

Precautions: liver disease, make sure IV prep does not have Epinephrine

Pharmacologic Therapies: Class III antiarrhythmic drug

Categories:



4. Antiarrhythmics

Sotalol

Routes of Administration: Oral

Dose: 1-2mg/kg twice a day orally

Common uses: ventricular and supraventricular arrhythmias, ARVC (Boxer cardiomyopathy)

Mechanism of Action: combine antiarrhythmic agent, beta blocker, blockade of potassium channels, prolongs QT interval

Side Effects: fatigue, GI upset, proarrhythmia

Precautions: negative inotrope, other antiarrhythmic agents, heart failure, asthma

Pharmacologic Therapies: Calcium channel blocker

Categories:

4. **Antiarrhythmics**

Diltiazem

Routes of Administration: Oral and IV

Dose: 1.5 mg/kg 3X a day orally, 0.25 mg/kg SLOWLY IV

Sustained release formulations (Cardizem CD, Dilacor)

Common uses: Hypertrophic cardiomyopathy and supraventricular arrhythmias (atrial fibrillation, SVT)

Mechanism of Action: calcium channel blocker

Side Effects: fatigue, GI upset (anorexia, vomiting, diarrhea) hypotension

Precautions: negative inotrope, other antiarrhythmic agents, heart failure,

Pharmacologic Therapies: Antithrombotics/Anticoagulants

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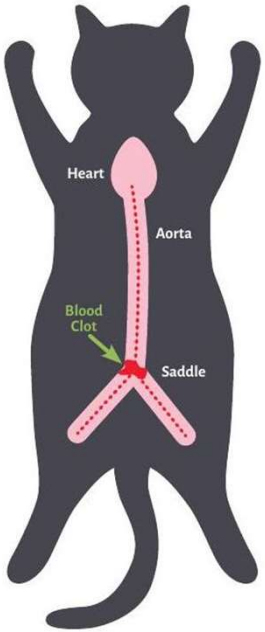


5. Antithrombotics/Anticoagulants

Aspirin

- Low dose in cats (1 mg/kg every 3 days)

Clopidogrel (Plavix)

- 3-5 mg/kg once a day dogs
- ¼ of 75 mg tablet once a day cats (caution administering medications)

Rivaroxaban (Xarelto)

- 1.25 mg -2.5 mg per cat per day
- Cost

Heparin

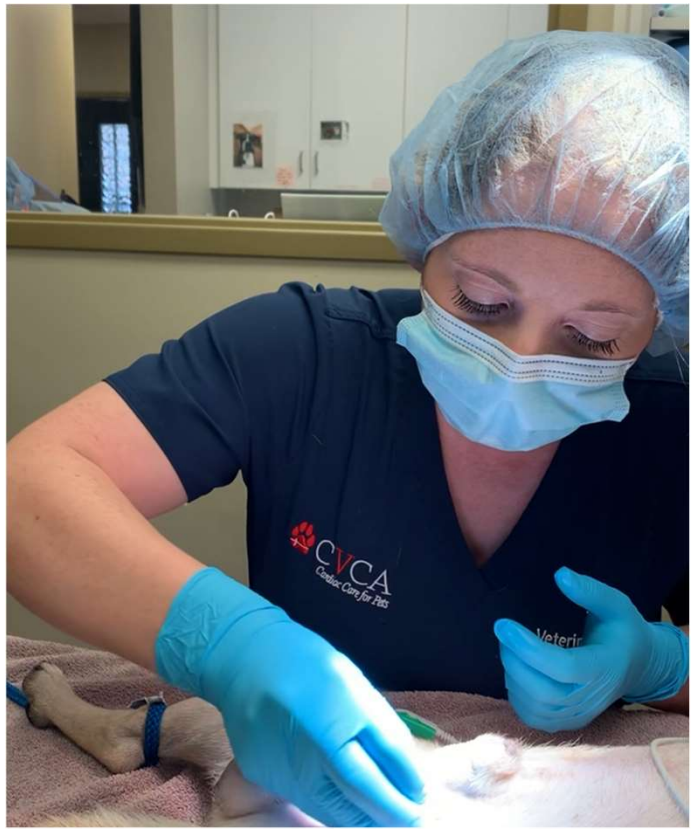
- Unfractionated
- Low Molecular Weight

Coumadin (warfarin)

Interventional & Surgical Therapies

- Balloon valvuloplasty (pulmonic/aortic stenosis)
- PDA ligation or coil embolization
- Pacemaker placement
- Pericardiectomy for pericardial effusion

Technician support: prep, anesthesia, and post-op monitoring

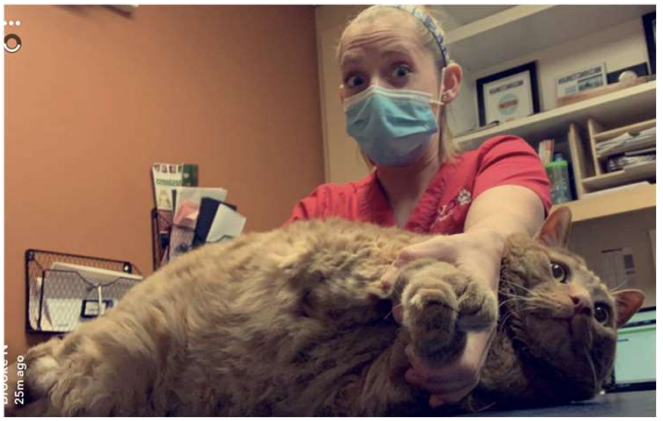


Technician Nursing Focus

Continuous **ECG and BP monitoring, oxygen therapy**, perform/assist with **thoracocentesis**

Client education:

- Medication compliance
- Resting respiratory rate monitoring at home
- At-home ECG monitoring
- Recognizing signs of decompensation



Case Example

Patient: “Charlotte,” 10-year-old FS Cavalier King Charles Spanie

Presentation:

History of a chronic cough, especially at night and after exercise
Recent onset of labored breathing and mild lethargy
Physical exam: Grade V/VI left apical systolic murmur, increased respiratory rate (60 bpm at rest), respiratory effort (2/4) mild crackles on lung auscultation

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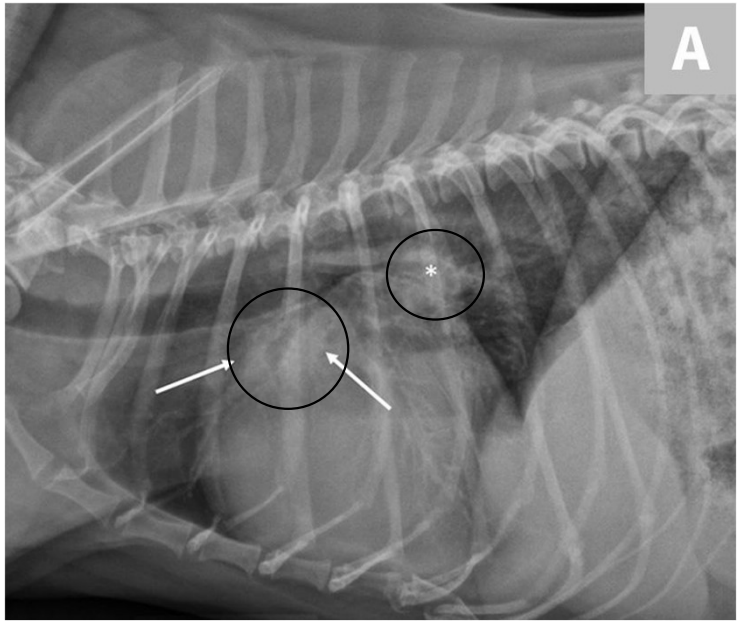
Case Example

Patient: "Charlotte," 10-year-old FS Cavalier King Charles Spaniel

Oxygen therapy, IM sedation, IM lasix

Diagnostics (once more stabilized):

- **Thoracic radiographs:** Left atrial enlargement, pulmonary venous congestion, mild pulmonary edema
- **Echocardiogram:** Severe mitral regurgitation, left atrial and ventricular dilation
- **Blood pressure:** Mild systemic hypertension at 170mmHg
- Resting respiratory rate (RRR): 44 bpm at home



Diagnosis by Cardiologist: *Stage C Degenerative Mitral Valve Disease with congestive heart failure*

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Case Example

Patient: "Charlotte," 10-year-old FS Cavalier King Charles Spaniel

Treatment TGH:

Furosemide: 2 mg/kg PO BID-TID based on RR/RE
Pimobendan: 0.25 mg/kg PO BID
In 3-4 days start **Benazepril** 0.25 mg/kg PO QD
In 1 week start **Spironolactone** 1mg/kg PO BID
Client instructed on **RRR monitoring** and **signs of decompensation**

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Case Example

Patient: “Charlotte,” 10-year-old FS Cavalier King Charles Spaniel

Technician Role:

- **Educated client** on how to monitor RRR at home using a smartphone app
- **Demonstrated** proper medication administration and discussed importance of compliance
- **Scheduled recheck** appointment and coordinated follow-up diagnostics
- **Monitored vitals** and **ECG** during initial hospitalization
- **Provided oxygen** therapy and assisted with radiographs

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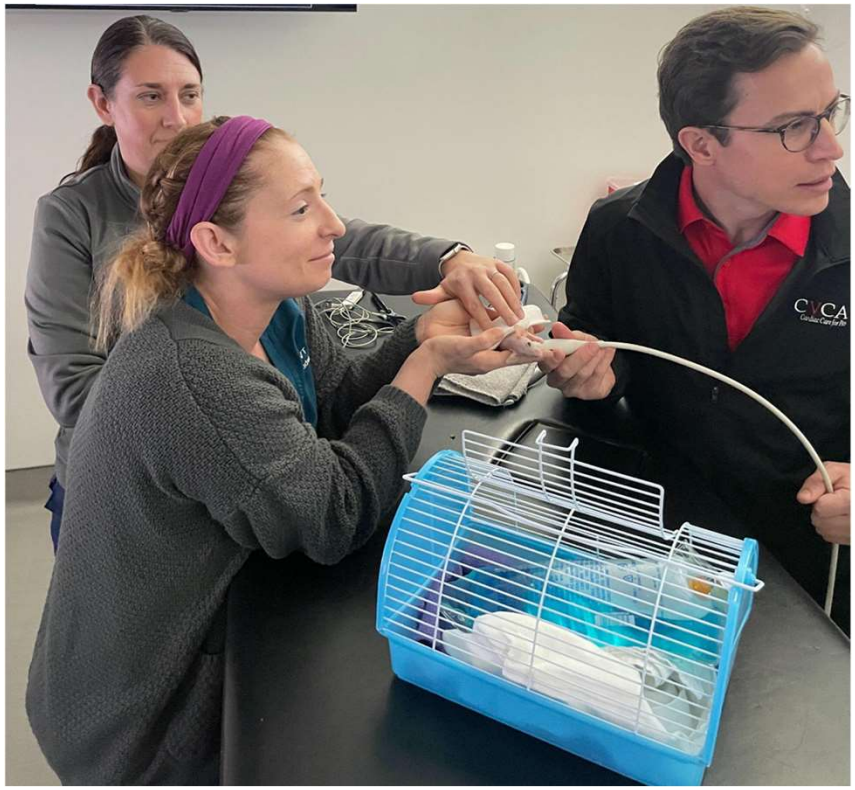
Key Takeaways

- **Technicians** play a **crucial role** in **early recognition**, **monitoring**, and **education**
- **Understanding cardiac drugs** improves patient safety and outcomes
- **Collaboration with veterinarians** and **cardiologists** is key to success



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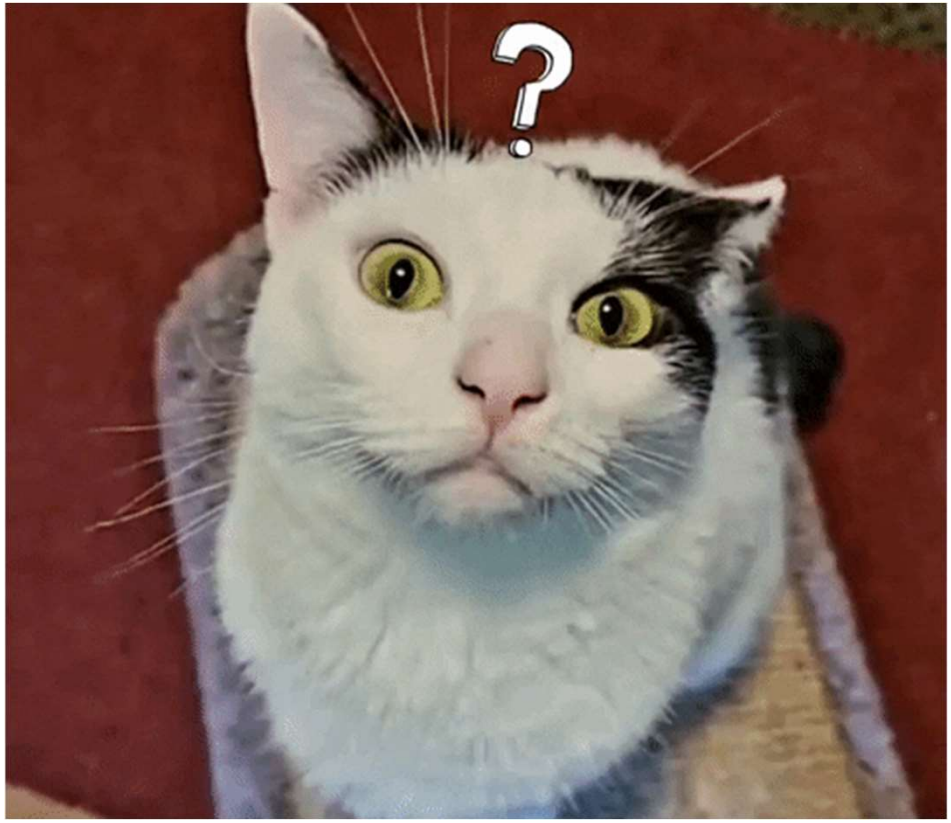
Questions / Discussion



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