Gross and Histopathologic Findings in Olive Ridley Sea Turtle Hatchlings

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CEIEPAA
Centro de Enseñanza, Investigación y Extensión en Producción Animal en Altiplano

The Rufford Foundation

CAMPAMENTO ESCUELA TORTUGUERO Bocas del Toro

Introduction

7 sea turtle species worldwide

- 6 nest in Mexico

- Classified by the IUCN —
Threatened with extinction

International union for conservation of nature






UICN 2024; Robinson, 2013

Characteristics

- *Lepidochelys Olivacea*

“Golfina”- Olive ridley

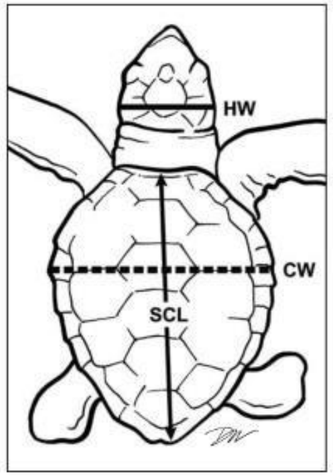
(UICN) **vulnerable**

- CITES- ***Threatened with extinction***

UICN, 2024

Characteristics

- Smallest species of the *Cheloniidae* family
- Olive-green carapace (60–80 cm)
- Adult weight: 38–50 kg (15-y)
- Hatchling size: 4 cm (≈20 g)



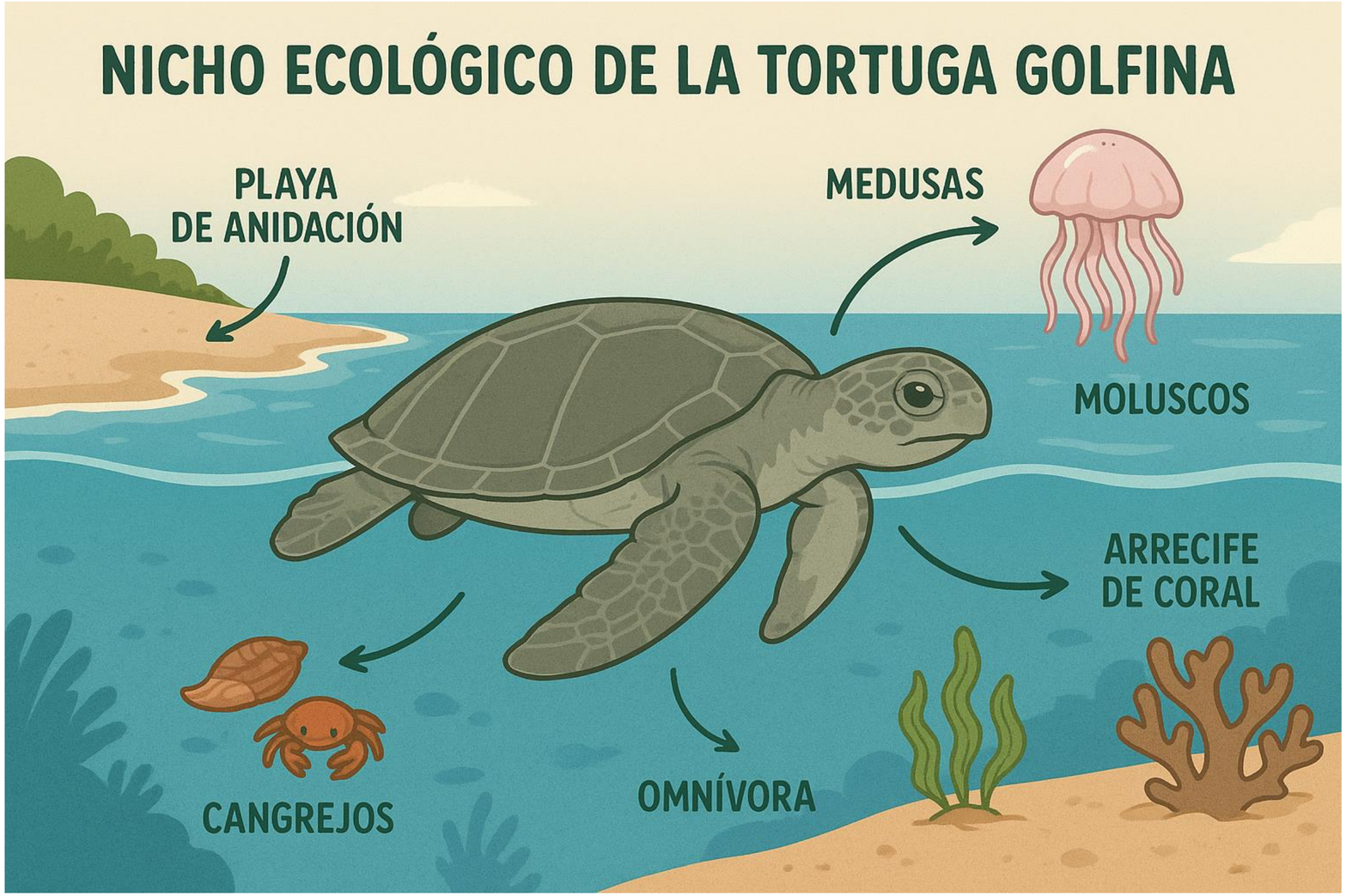
CONANP, 2016

Characteristics

Trophic networks:

Predator and prey — contributes to the regulation of marine populations

Feeds on sponges, allowing more space for corals — helps reduce CO_2



CONANP, 2016

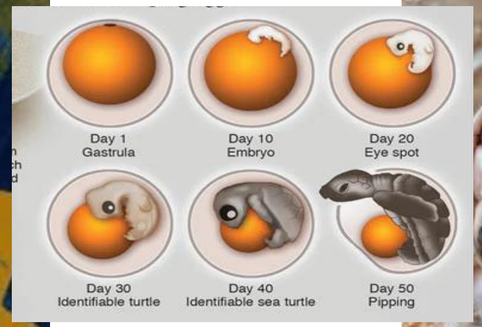
Characteristics

Distribution

Pantropical species:

- **Wide migration range**
- **Found in the Atlantic, Pacific, and Indian Oceans**

- **In Mexico: Pacific and Gulf coasts**



CONANP, 2016

Feeding

Depends on their life stage

Embryos: energy from the yolk sac
Juveniles–Adults: fish eggs, algae, crustaceans, mollusks, and fish (omnivorous)

Nesting

Season July-January

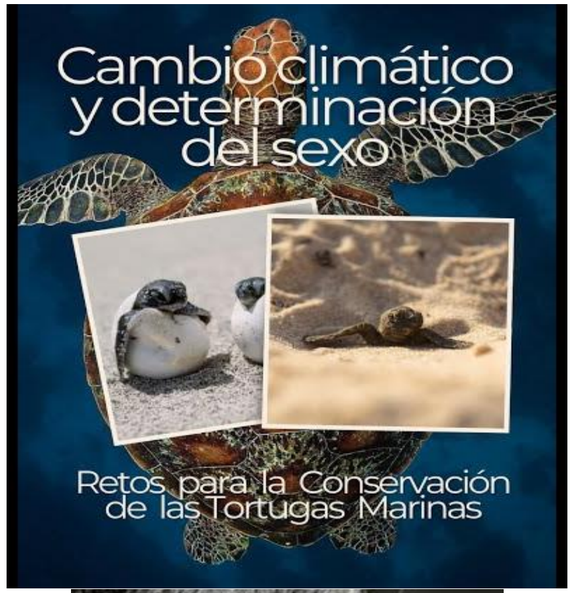
They nest in the same location every 2-3 years (mineral imprinting)

•Average egg count: 100

•Incubation time: 45 to 70 days

CONANP, 2016; Ríos- Huerta et al., 2021

Threats



Environmental factors

Rising temperatures

•Beach erosion due to hurricanes

Sea level

•Natural depredation

NOAA, 2024

Threats

Anthropogenic factors

- Bycatch
- Urbanization
- Light-hotels
- Poaching
- Unregulated tourism
- Pollution

Derrames

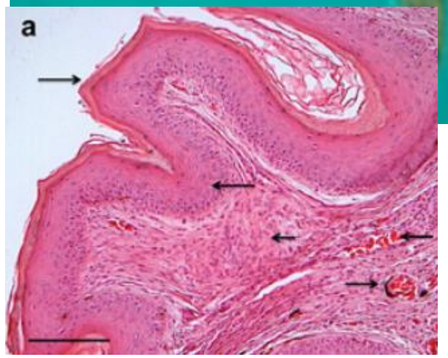
NOAA 2024

Threats

Others

Immunosuppression

Diseases

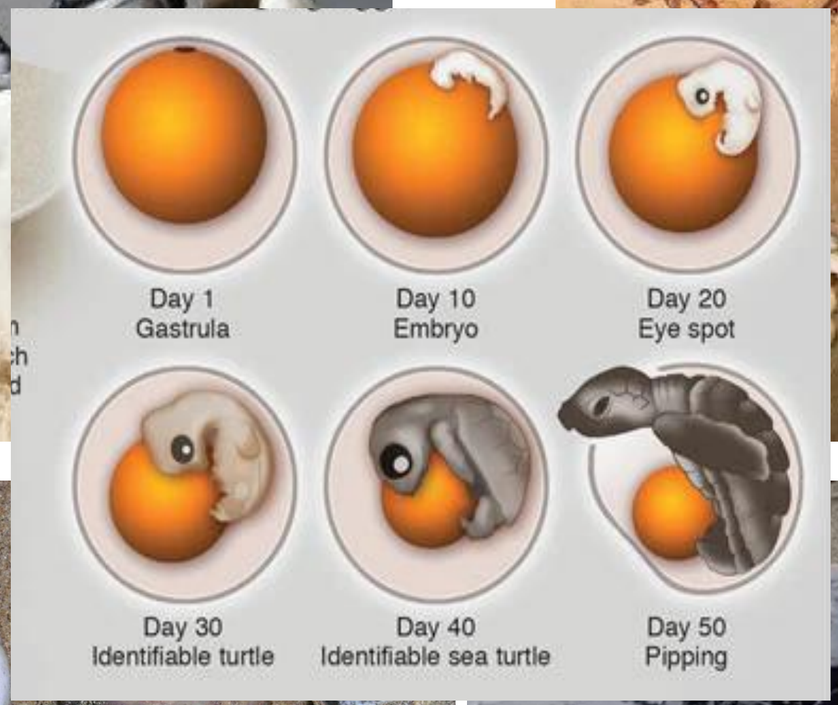


NOAA 2024

Hatching **success** and hatchling quality are critical to their **survival** in the open ocean.
(1 in 1,000)

Genetic, physical, chemical and physiological factors **affect** the incubation process

Sea turtles - long-lived (Exposed to contaminating compounds in diet
(Bioaccumulation)



Ibarra et al 2009; Ríos- Huerta et al., 2021

Objectives

1. Evaluate hatching success and hatchling “quality”

2. Quantification of environmental pollutants

3. Infectious diseases (nest)

SEMARNAT permit

SBRA/DGVS/01065/25

Ecología, Salud y Contaminación Ambiental en la Tortuga Golfina (*Lepidochelys olivacea*) en el Pacífico Mexicano

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**As part of objective 1*

Study malformations and other pathologies-findings

Figure 3. Albino olive ridley embryo (*Lepidochelys olivacea*) with lower prognatia and anophthalmia.

Figura 3. Embrión de Tortuga golfina (*Lepidochelys olivacea*) albino con prognatismo y anoftalmía.

Relatively rare, they indicate negative changes in the biology of sea turtles.

Ibarra & Gasca 2009; Rojas, M., & Walker, L. (2012), Kuschke et al 2023, Ríos-Huerta et al.,2021

Other pathologies

- Infectious agents

Understand possible causes of death.

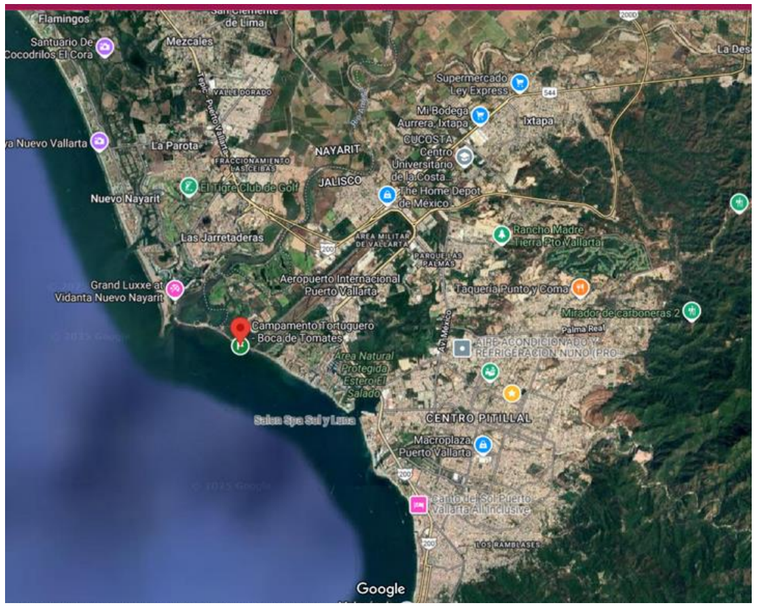
**Potential long-term effects in natural populations

Ibarra & Gasca 2009; Rojas, M., & Walker, L. (2012), Kuschke et al 2023, Ríos-Huerta et al.,2021

Study Site

Boca de Tomates Turtle Camp, Puerto Vallarta, Jalisco, Mexico.

Beach length: ~3 km. Tropical climate; important nesting site for the species in the region



Ex-situ

CAMPAMENTO ESCUELA TORTUGUERO Boca de Tomates

Methodology

Night patrols (egg collection)

Collect natural nest (in-situ)

Ex-situ nest Hatchery

Methodology

Incubation:

They hatch and their nests are cleaned 24 hours after hatching.

Hatchlings dead- (naturaly)

Organs (liver, kidney, brain) for environmental pollutants* (liquid nitrogen)

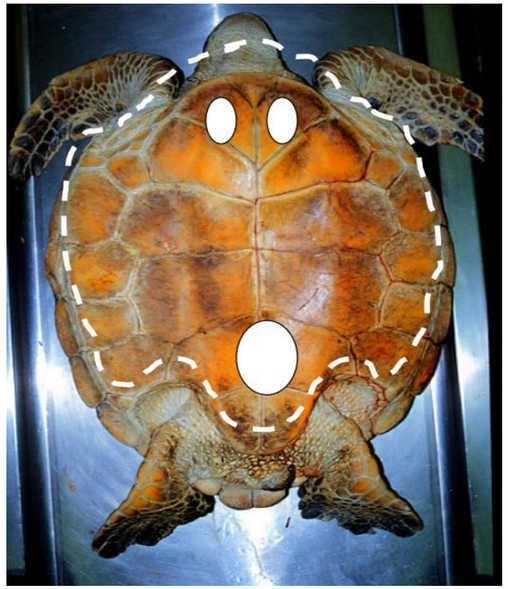
Taking advantage of the collection permit.
Secondary pilot study
Macro and micro findings

Methodology

1. An external inspection was performed on each individual cr-cd;dr-vn.
2. Carapace Width and Straight Length (mm) were measured.

3. Weight (g)

Methodology



Necropsy (Pilot)

- 8 underwent necropsy and 7 were submitted to histopathology.
- External assessment of malformations was performed according to Bárcenas-Ibarra & Gasca, 2009.
- Necropsy technique described by Thierry Work, 2000.

Fixation in 10% NBF e.g. heart, liver, lung, kidneys and gastrointestinal tract

THIERRY M. WORK, DVM 2000

Histological processing.

Fixed-embedded tissues were sectioned at 4 µm and stained with H&E; slides were evaluated using a LEICA microscope (USEDICO-CEIEPAA).

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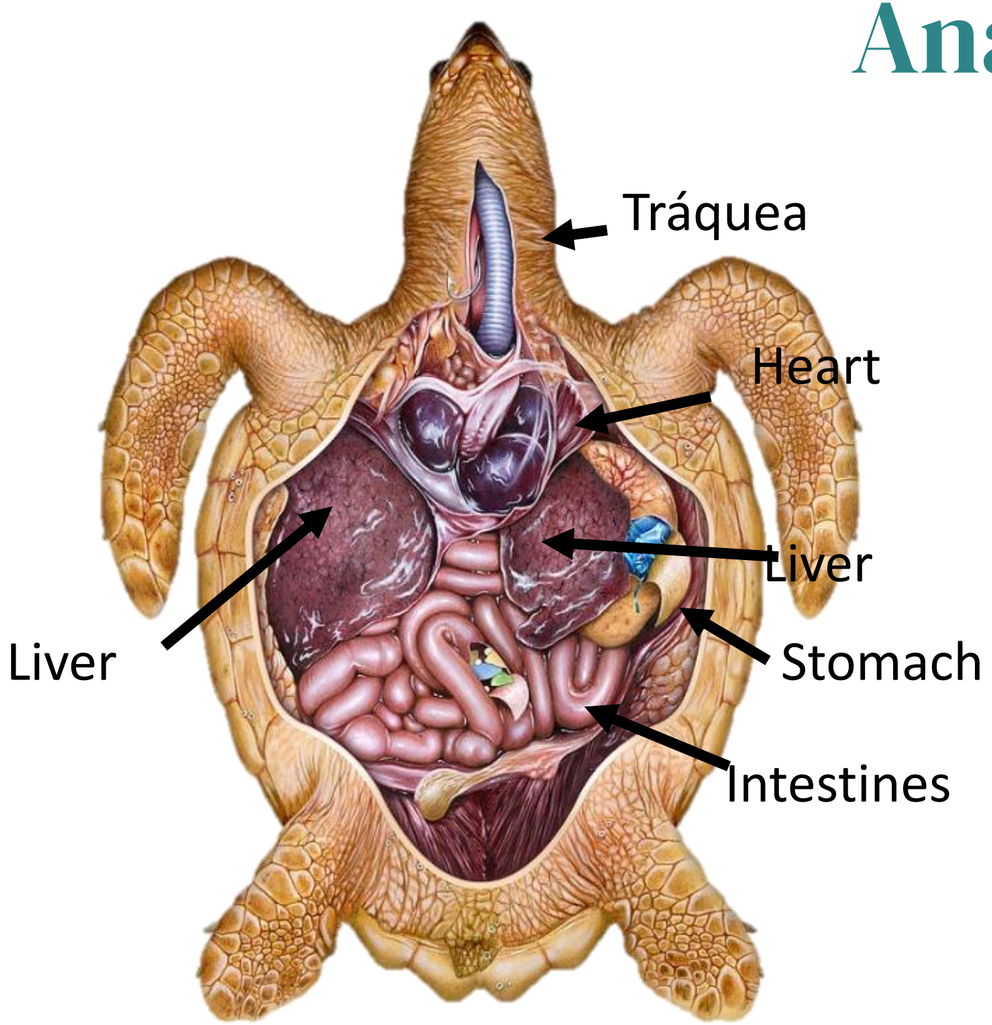
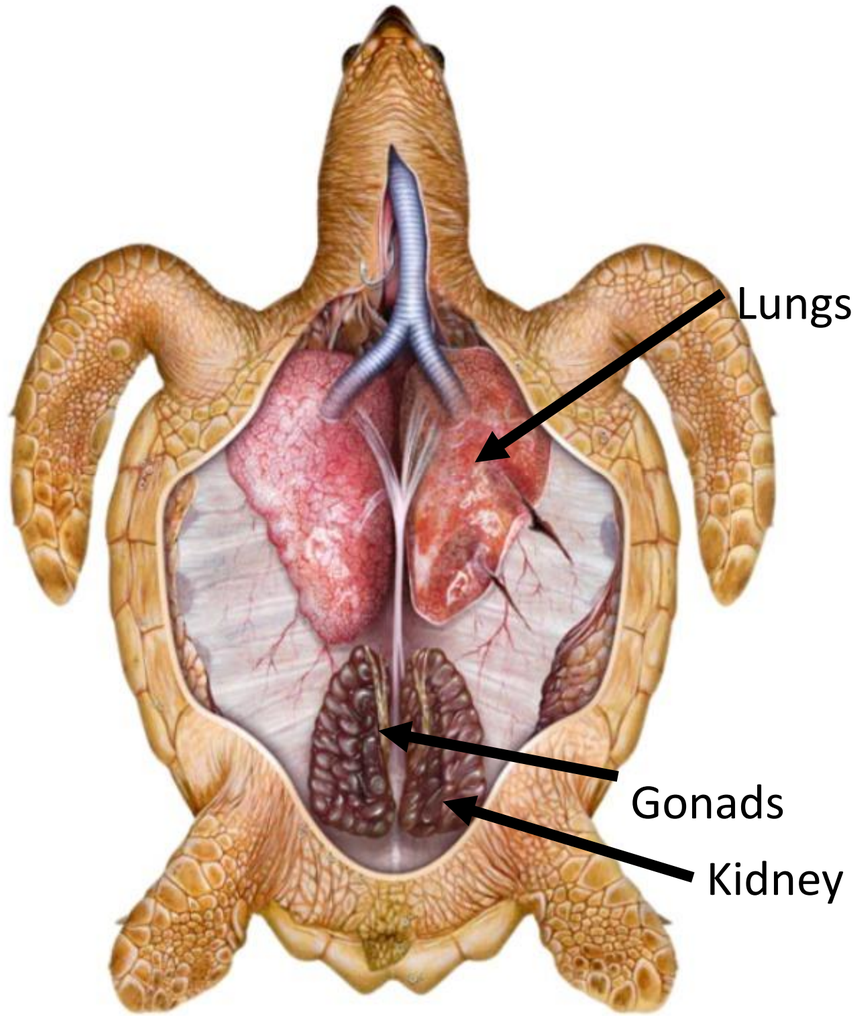
Anatomy





Wyneken j., 2001

Findings

The presence of macroscopic findings was classified by affected organ (general)

Organs-Findings	N N=7	%
Muscle (Atrophy)	4	57.1
Vitelin sac (congestion, persistence)	5	71.4
Heart (Cardiomegaly; congestion)	6	85.7
Lungs (congestion)	6	85.7
Liver (hepatomegaly, necrosis, congestion)	7	100
GI (enteritis, congestion)	3	42.9
Kidney (congestion)	2	28.6
Malformation	2	28.6

EJEMPLO 1

Turtle with malformation

Carapace: Irregular carapace

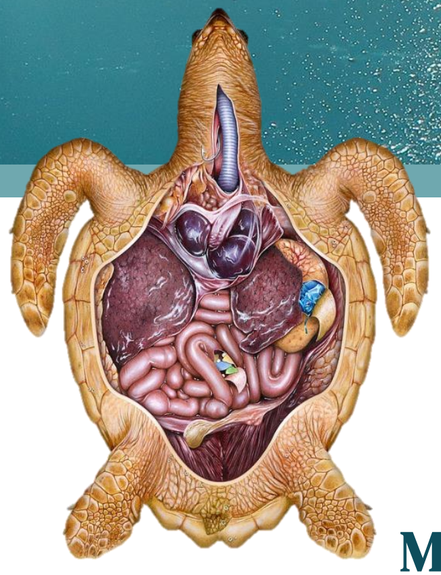
Fins: Dysplasia of the posterior fins with dorsocaudal deviation toward the carapace

Umbilicus: Umbilical hernia

SDC-25-313 (CMM-01)

Weight: 15 gr
LRC: 30.5 mm
ARC: 30.1 mm
BC: Good

EJEMPLO 2



Heart:

Moderate generalized cardiomegaly

Mild to moderate generalized congestion

Liver:

Mild generalized necrosis

Mild to moderate multifocal coalescent congestion

SDC-25-313 CN-17
LRC: 43.7MM
ARC:32.3 MM
Weight: 20 gr

Micro findings

Órgano	Lesión principal	Frecuencia N=7
Liver	vacuolar degeneration	6
Liver	congestion	3
Liver	Hepatitis	3
Lungs	Pneumonia	4
Lungs	Edema	1
Lungs	Congestion	5
Heart	Myocarditis	4
Heart	Necrosis	2
Kidney	Hydropic degeneration	5
Kidney	Mineralization	3
kidney	Glomerulonephritis - nephritis	2
Kidney	congestion	5

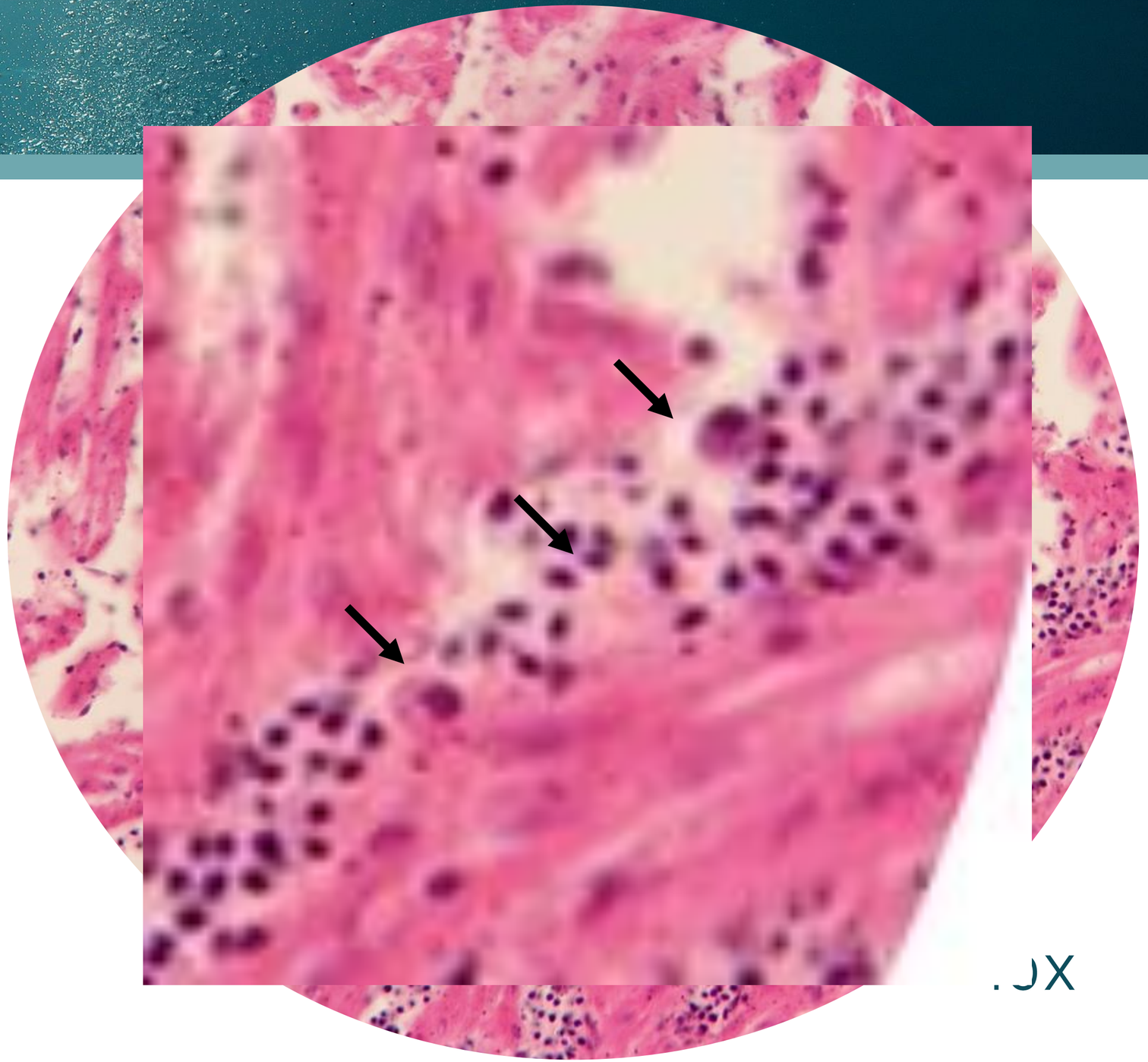
A **binary classification** was performed to record the presence (1) or absence (0) of microscopic lesions in each organ evaluated.

Relative frequencies were then calculated, considering a total of N = 7 individuals.

Orós *et al.*, 2020

Heart

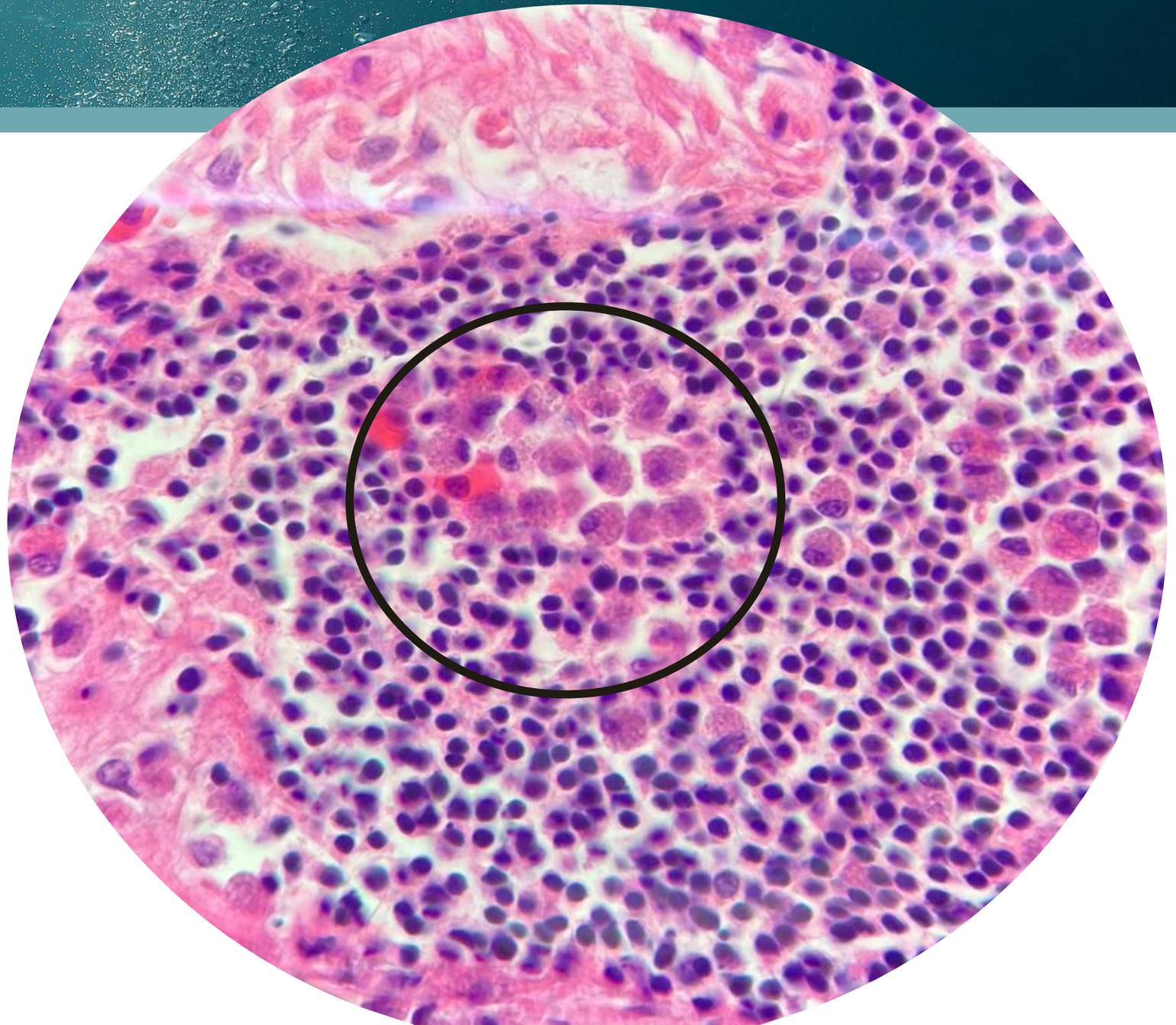
Moderate, multifocal lymphoplasmacytic heterophilic myocarditis



Heart

Moderate, focal lymphoplasmacytic heterophilic myocarditis

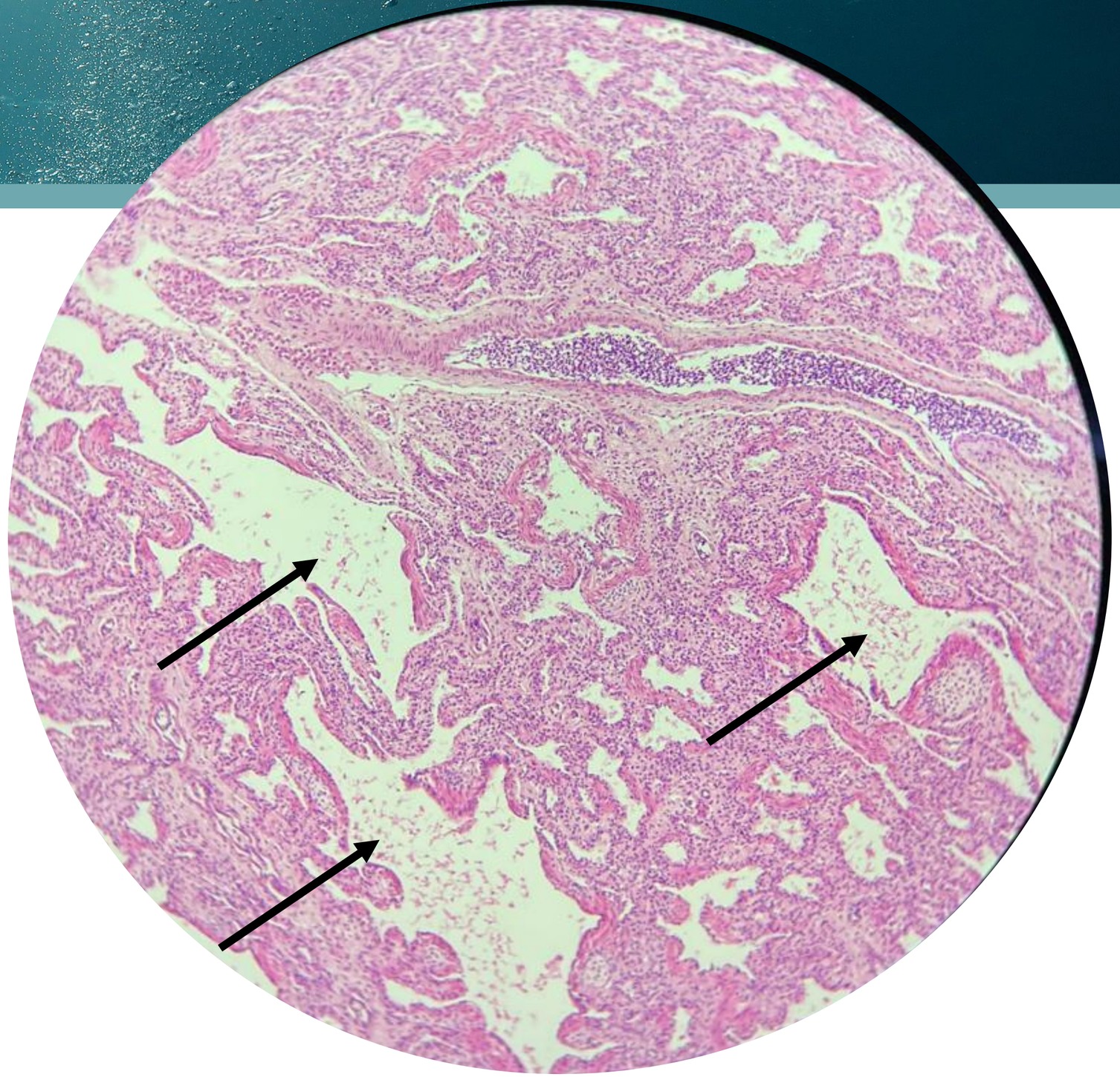
100X



Lungs

Mild, multifocal faveolar edema

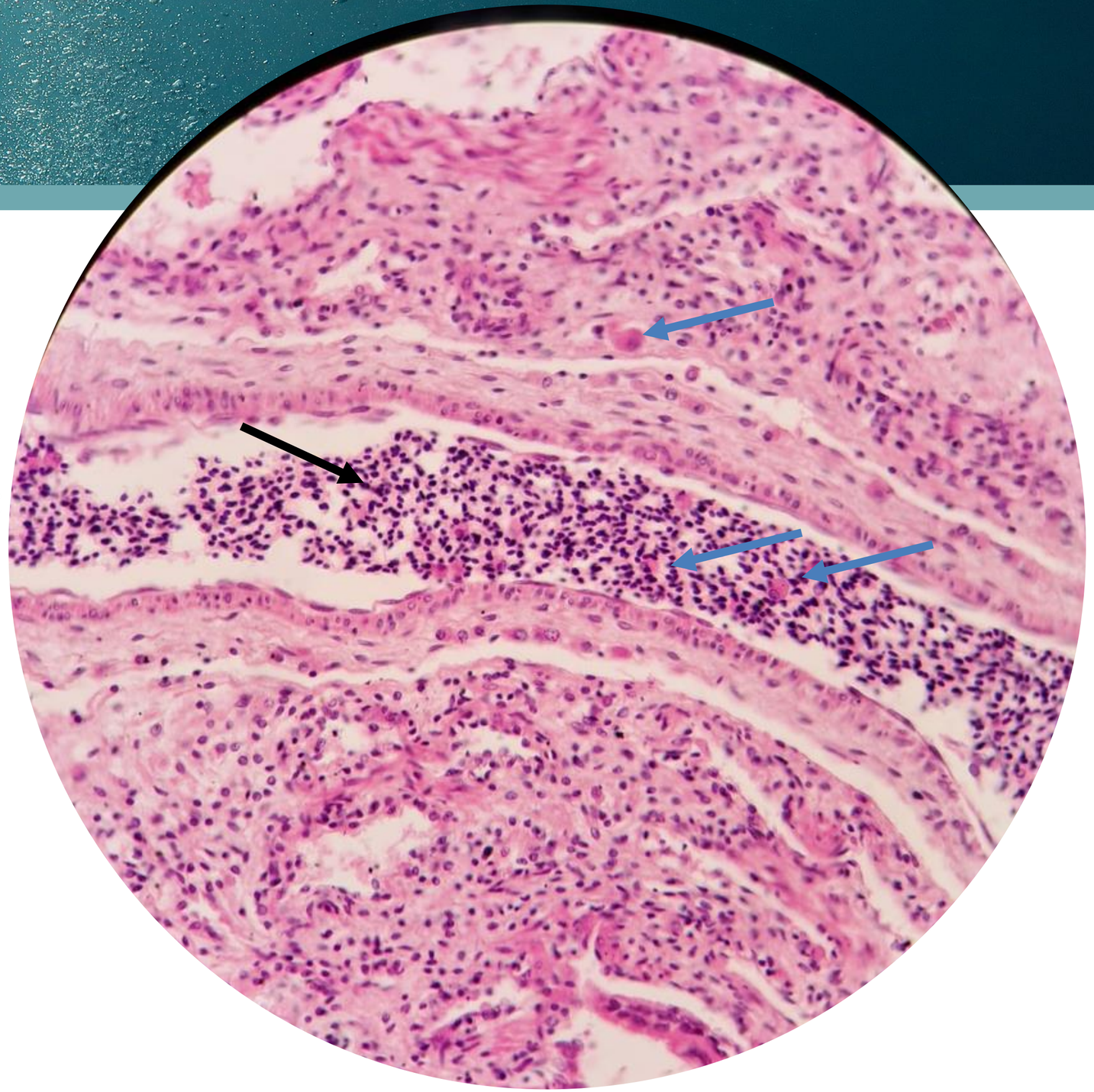
10x



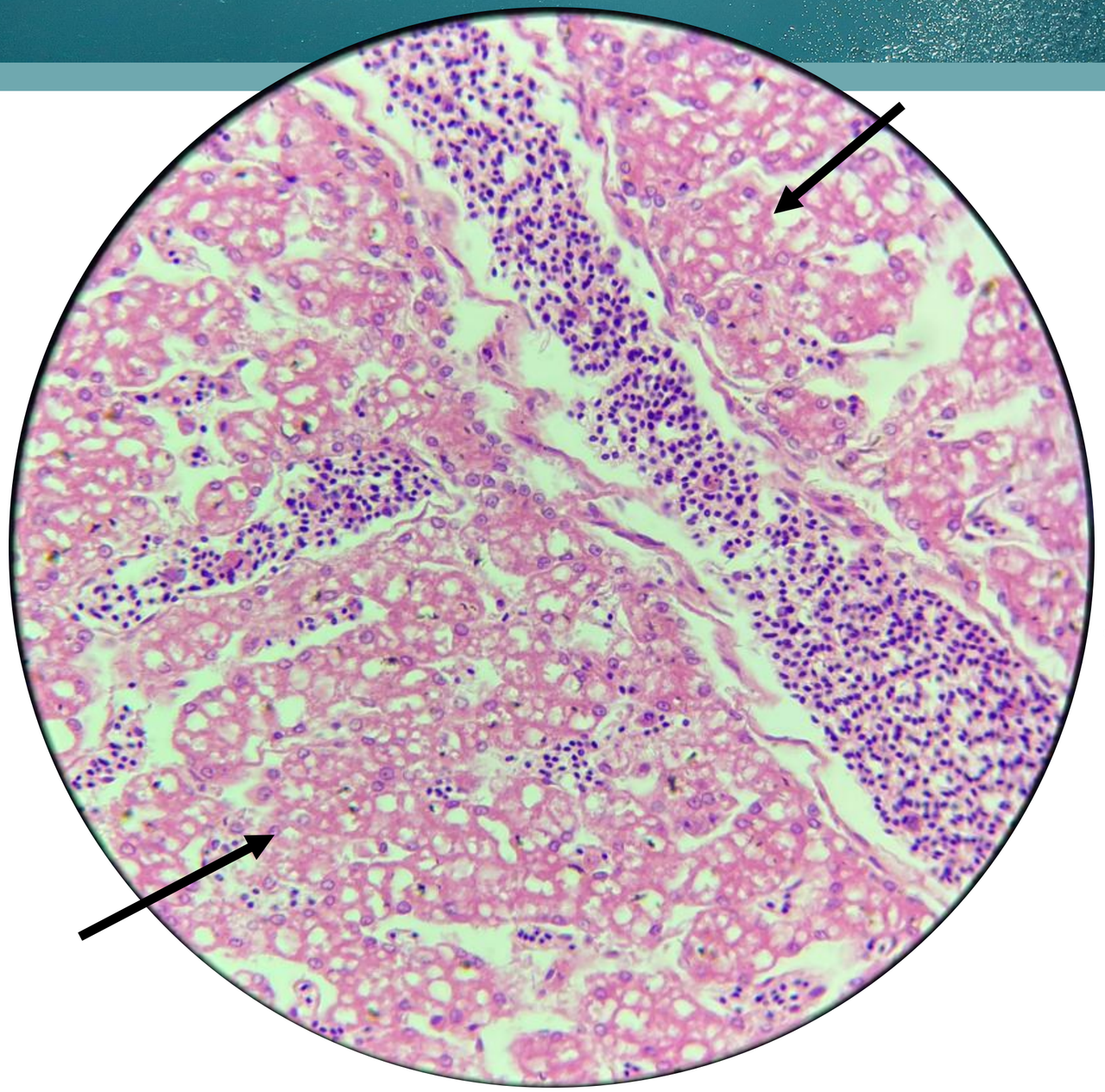
Lungs

Mild, focal lymphoplasmacytic heterophilic pneumonia

40X



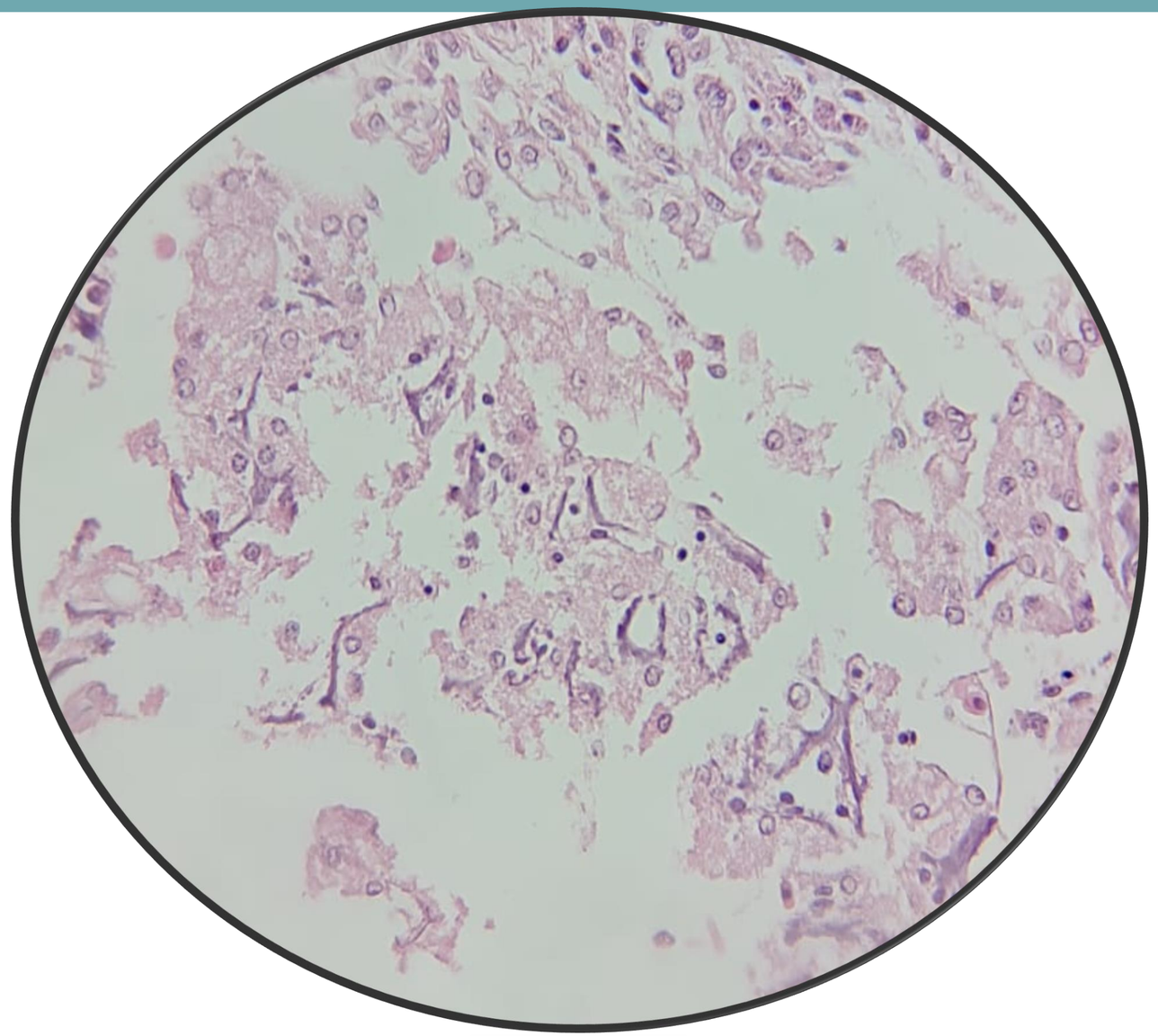
Liver



- Moderate, diffuse vacuolar degeneration.
- Mild, multifocal lymphoplasmacytic histiocytic hepatitis

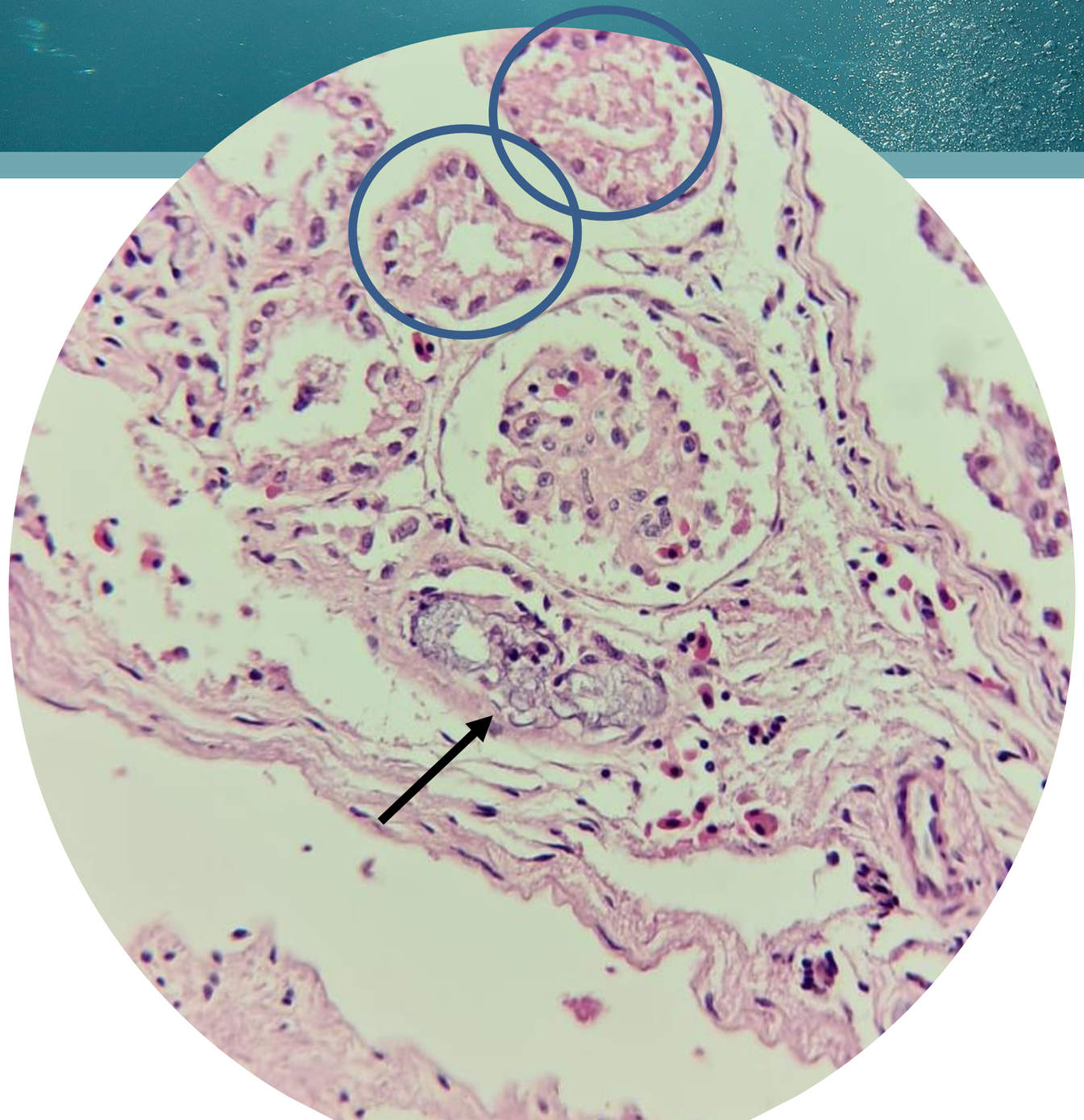
40x

Liver



Fungal structures were observed in the tissue sections

Kidney



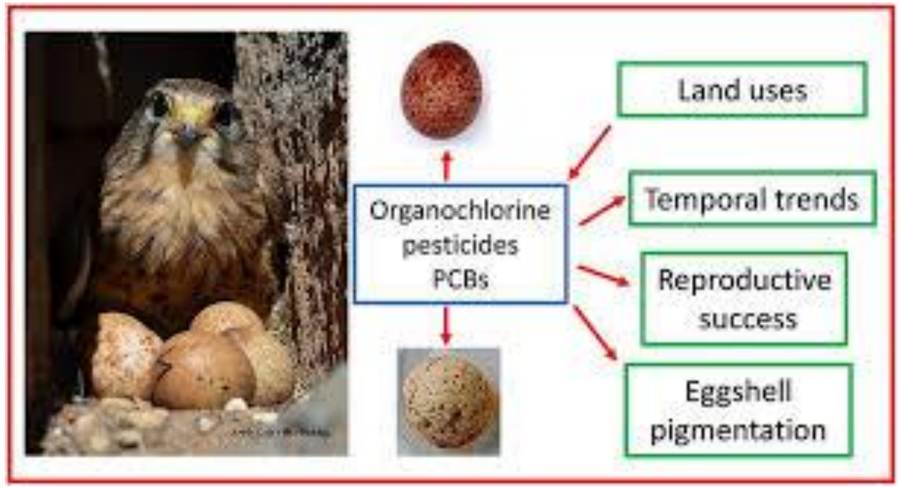
- Moderate, diffuse hydropic degeneration
- Mild, multifocal mineralization

Comentary

In this pilot study of *Lepidochelys olivacea* hatchlings, congenital malformations and other injuries incompatible with life were identified

Congenital abnormalities and injuries can be caused by

- genetic causes
- exposure to environmental factors (T°)
- infectious agents
- chemicals or drugs



et al., 2018

Next- Pilots

PCR (*Fusarium spp*)

Quantification-pollutants

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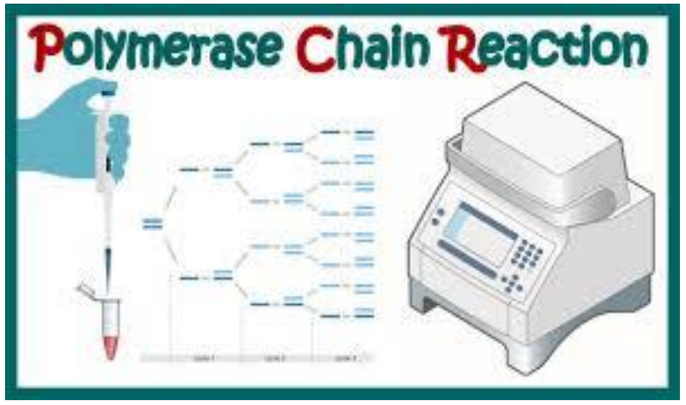
Protecting Sea Turtle Hatchlings: Evaluating Nest Health Success and Threats in Puerto Vallarta, Mexico

17 JUL 2025 Boca de Tomates Sea Turtle Camp, Puerto Vallarta, Jalisco, México, Central and Latin America Communities | Marine | Turtles



through PCR.

Gracias!