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# Histological, Parasitic and Bacterial Assessment of White Sea Urchins (*Tripneustes ventricosus*) in Saint Kitts, West Indies

Aakansha Virwani, Michelle Dennis, Mark Freeman

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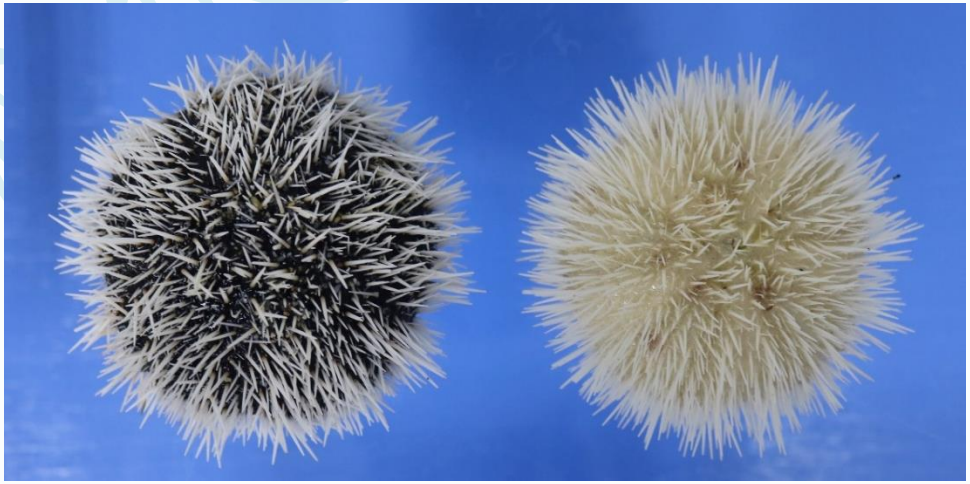
# White Sea Urchins (*Tripneustes ventricosus*)

- Main algae and sea grass grazer
- Have many interactions with other organisms – have an important ecological role [4]



**White sea urchins. Left- Wild type. Right- Albino.**

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**White sea urchins at Cockleshell Bay**

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**White sea urchins at Cockleshell Bay**

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# Why white sea urchins?

- High importance in marine ecosystem- noted decline in numbers
- West Indian sea egg
- Literature ↓ [2 & 4]

**Gonads or "eggs" of the white sea urchins**

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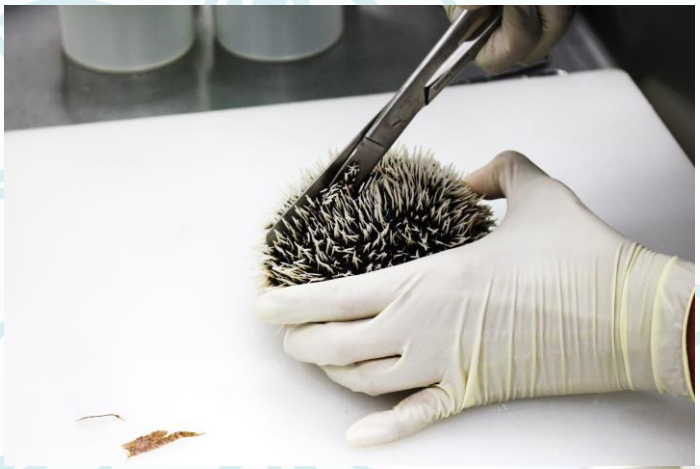
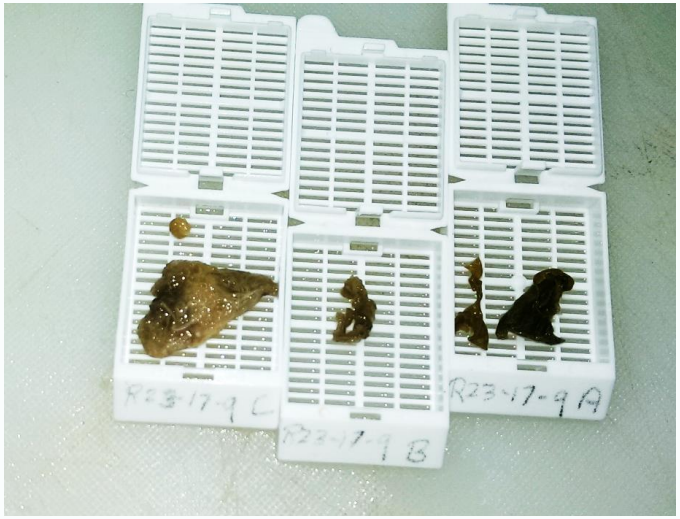
# Dissections & Discoveries Galore! (aka Methodology)



Sea urchins dissected so far= 27



**Histology processing**

**Sea urchin dissection**

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# What We Found (Results)

**Spineless sea urchins with low gut ingesta.**

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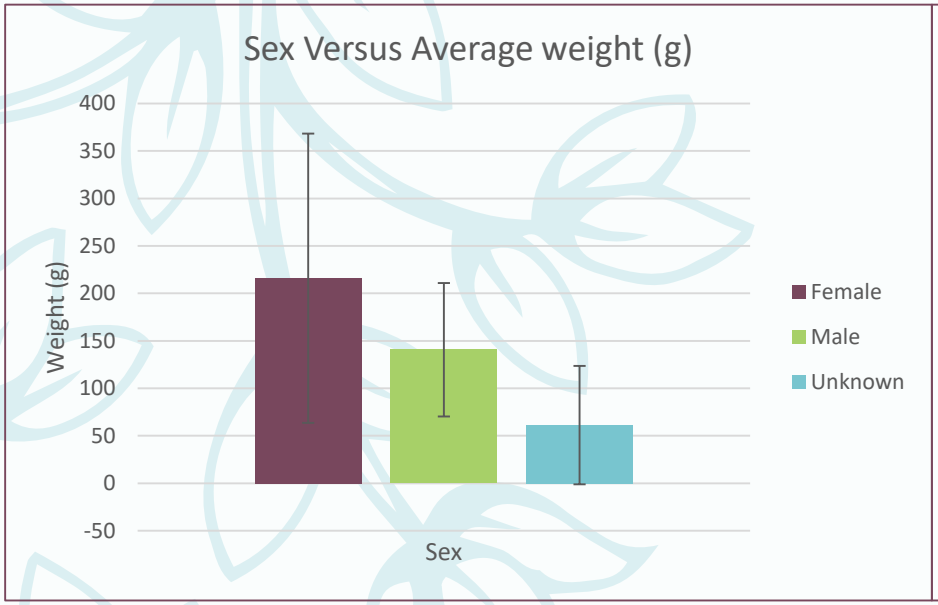
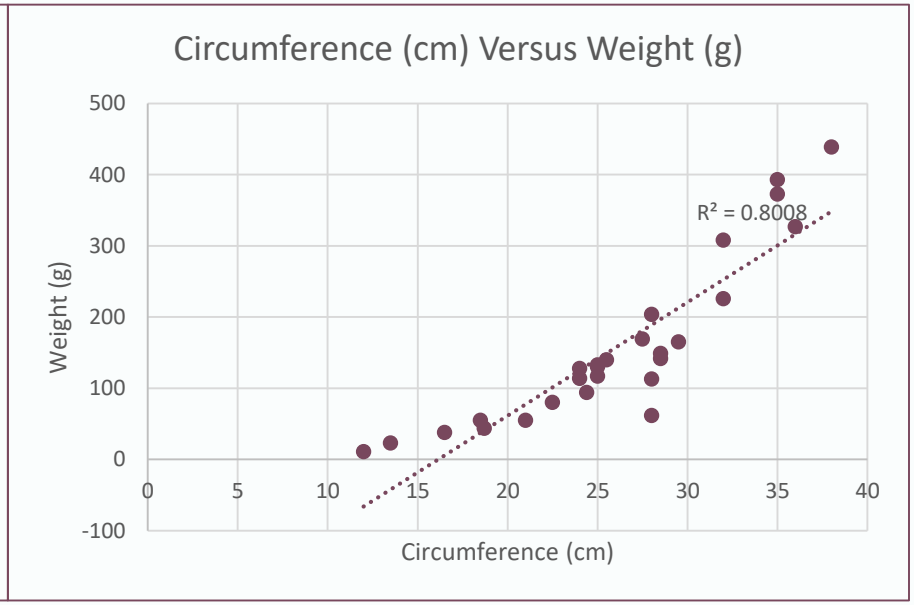
# What We Found (Results)

**Comparisons of weight with circumference and sex of white sea urchins.**




**Graph 1:** The weight of the sea urchins corresponds to their sex. Females tend to be heavier compared to males. 'Unknown' is for the urchins who did not have any developed gonads.

**Graph 2:** The circumference of the sea urchins is directly proportional to their weight. The $R^2$ is close to 1 which means there is good correlation between the two variables.

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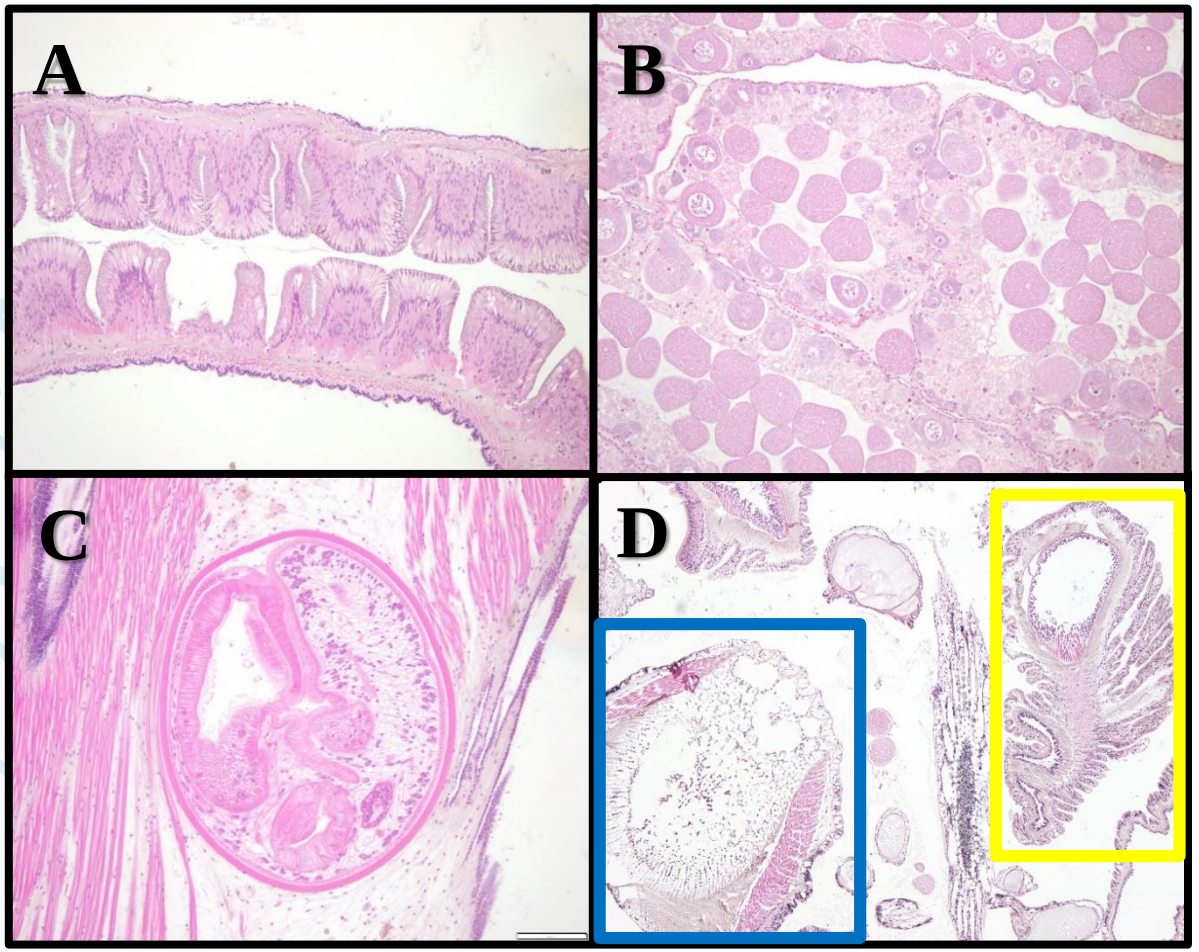
# What We Found (Results)

**Hematoxylin & Eosin stained histology slides from fixed tissues.**

A- Intestine (10x). B- Ovarian tissue (10x). C- Digenean metacercaria in muscle layer of Aristotle's lantern (40x). D- Test (10x). Blue box: Remaining spine matrix and surrounding muscle layer. Yellow box: Tube feet. [5]

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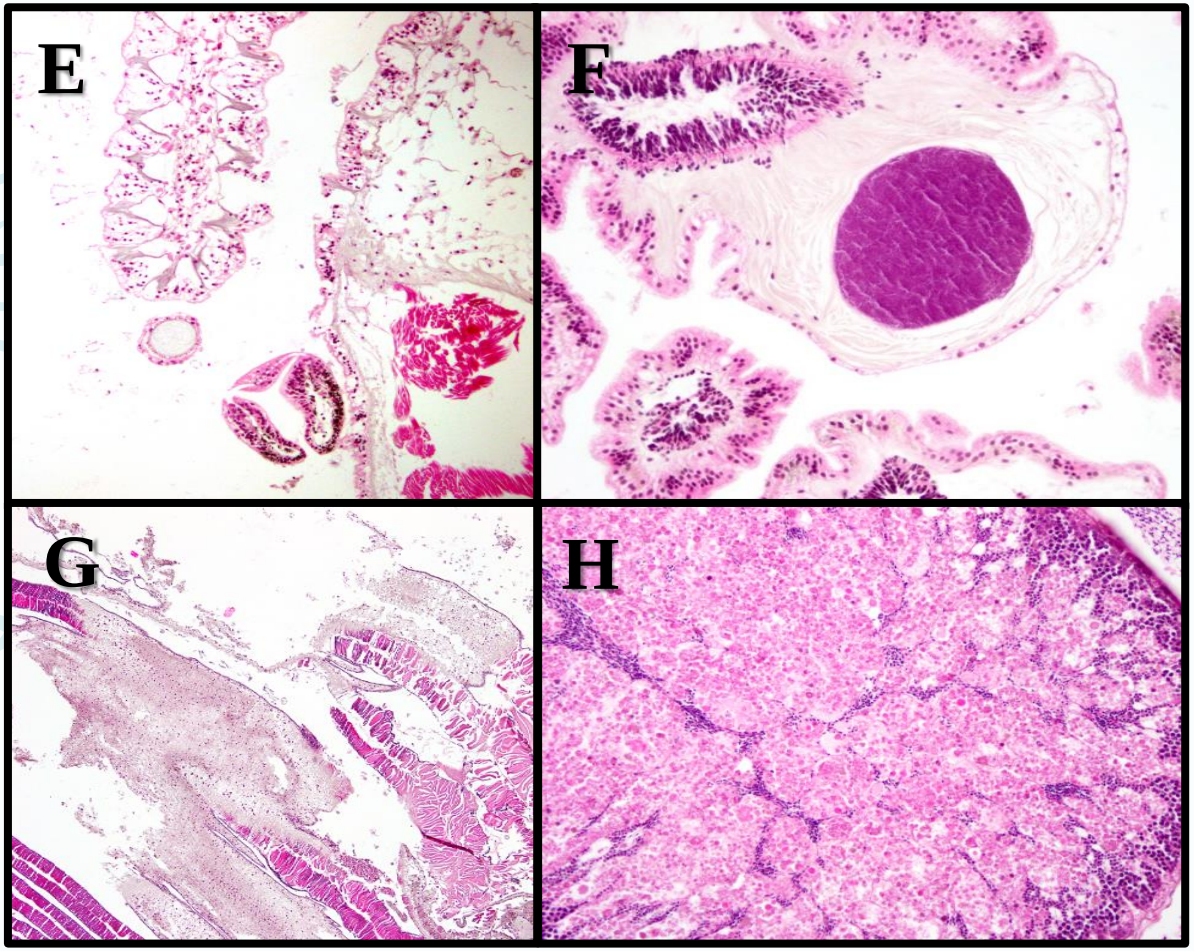
# What We Found (Results)

**Hematoxylin & Eosin stained histology slides from fixed tissues.**
E- Inflammation of pedicellaria (20x). F- Bacterial aggregate in gills (40x). G- Degeneration of the interpyramidal muscle of Aristotle's lantern (10x). H- Involution of male gonads (40x). [5]

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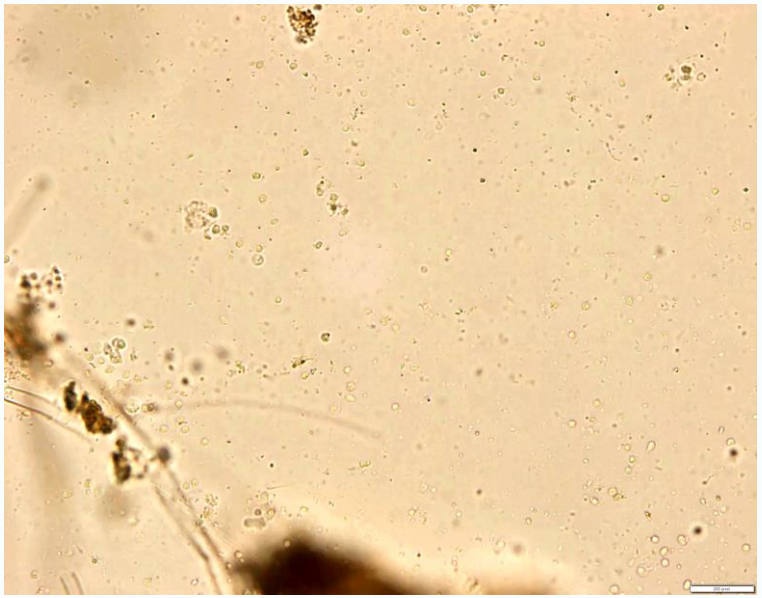
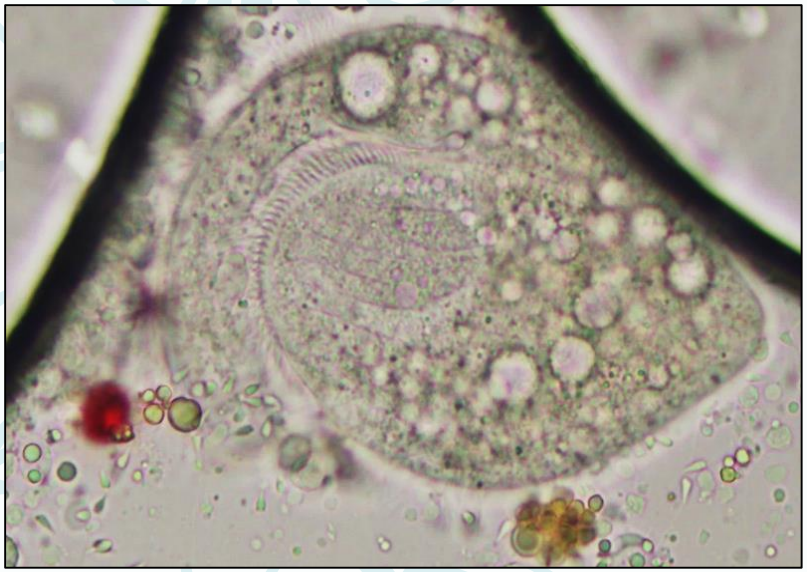
# What We Found (Results)



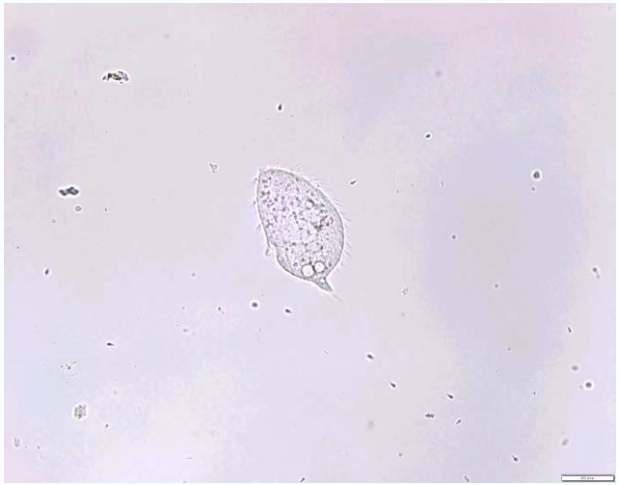
**Type 6 ciliate in white sea urchin esophageal and gonadal wet mounts (40x).**

# What We Found (Results)



**Type 5 ciliate in white sea urchin gonadal and intestinal wet mounts; possibly (*Parametopus circumlabens)* (40x). [2]**

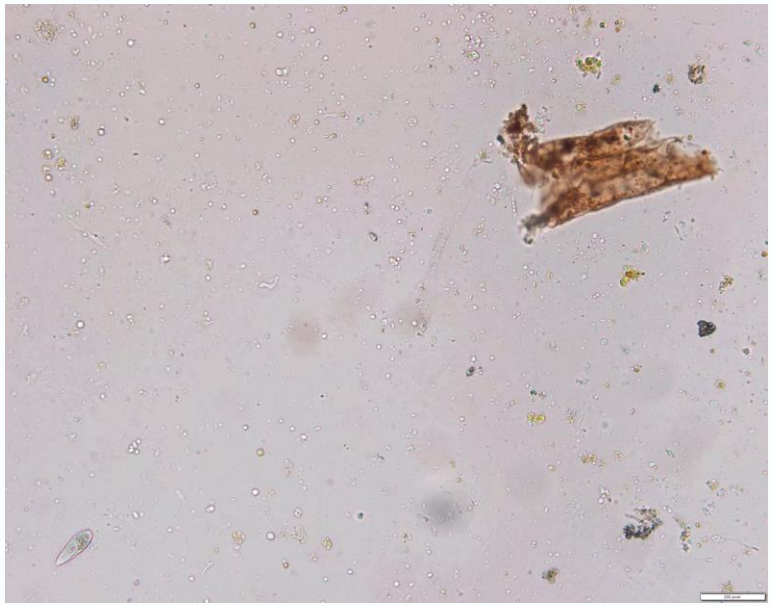
# What We Found (Results)



**Type 1 ciliate in white sea urchin in esophageal, intestinal, gonadal and coelomic fluid wet mounts; possibly (*Entorhipidium triangularis* or *Biggeria bermudense*) (40x). [2 & 3]**

# What We Found (Results)

**Type 4 Ciliate in white sea urchin gonadal and intestinal wet mounts; possibly *Amphileptus punctatus* (40x). [2]**



**Type 3 ciliate in white sea urchin intestinal and coelomic fluid wet mounts (100x).**

# What We Found (Results)

**Type 1 flagellate in white sea urchin gonadal wet mount (40x).**

# What We Found (Results)

Bacterial isolation from the gonads- Sensititre™ OptiRead™ results:

- *Shewanella putrefaciens*
- *Elizabethkingia meningoseptica*
- *Vibrio fluvialis* and *Vibrio alginolyticus*
- *Pseudomonas fluorescens* and *Pseudomonas aeruginosa*

– In the process of PCR and sequencing

# So What Now?

- Ciliates and flagellates [3, 7,8 & 9].
- Spineless sea urchins had low gut ingesta- unable to latch to substrates- possibly due to an opportunistic bacterial infection.
- More pathology in males compared to females – possible indication of females being more immunologically active than the males [1].

# So What Now?

- Some of the bacterial species isolated were found in other bacterial studies. Other bacterial studies found endospore & toxin producing bacteria and enteric pathogens [6].
- Sea urchin research -prevent and predict mass mortalities -significant for economy and aquatic ecosystems.

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# Main References


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# Questions?

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# Thank You!