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AIR BUBBLE ENCAPSULATION OF EUKARYOTIC CELLS AND THERAPY FAILURES

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ABSTRACT

Background: The purpose of this manuscript is to introduce a newly discovered potential dangers of air bubbles used for therapeutic or diagnostic purposes into the human body.

At present, the injection of air bubbles into the human body for diagnostic purpose is viewed positively by the medical/scientific community. In Vitro experiments are presented whereby cells isolation by air bubbles could interfere with chemotherapy treatments.

Methods: Author's own saliva sample was spitted out onto the center of a clean 25X75x1mm glass slide. The sample was placed and focused on the viewing platform of a video microscope. A toothpick was used to harvest inner cheek cells and gently transfer onto the spitted out sample. After focusing, areas were selected showing floating cells and air bubbles. Different laminar levels were observed by cells migrating at different levels. While microscopically observing the sample, the glass slide was disturbed by finger tapping, the aim to induce bubble bursting.

Results: Deformed cells were observed when adhering to the outer surface of air bubbles. Additionally, undeformed cells seen at two distinct perpendicular layers when trapped within the floating bubbles. Noticed was a selective attraction of cells by the outer edge of the floating bubbles. Cells attached to the bubble's edge were being deformed and attracted to each other. Cells were also observed passing unattracted when in a separate laminar flow under the floating bubble. The provocative tapping causing air bubbles to cavitate and burst.

Conclusions: The bursting of an air bubble is not the only factor in floating eukaryotic cells deformation. In this manuscript video microscopy and still images are introduced demonstrating a newly found horizontal flat parallel energy field in the periphery of the oxygen bubble. This energy is evident in the free-floating air bubble interface as cheek eukaryotic cells adhere only to the flat round edge of a bubble. Cells are attracted, adhered to each other, and deformed by their own intrinsic attraction. Once the bubble bursts, cells and debris are dispersed, with cells adherence partially disturbed. Cell deformations persisting. It could be hypothesized that cancer cells trapped at different laminar layers inside the bubble be refractory to external chemotherapy agents thus retaining their cancer characteristics.

Keywords: Air Bubbles, Effect Cheek Cells, Irreversible Cells Deformation, Cancer Genesis

1. INTRODUCTION

At present, the injection of air bubbles into the human body is viewed positively by the medical/scientific community. Some rules recommend as exceptions intra-arterial infusions in subjects with congenital circulatory anomalies. Oxygen bubbles are normally prevalent in some areas of the human body, such as in the surface of the digestive and respiratory systems, additionally some non-invasive procedures protocols use micro- bubbles as a tool for contrast enhanced ultrasound images and treatment Embi (2016), Embi (2019). Some examples are "ultrasound-mediated

therapy used in cases of joint inflammation, rheumatoid arthritis, and osteoarthritis. Microbubbles, when used as ultrasound contrast agents, can act as echo-enhancers and therapeutic agents, and they can play an essential role in ultrasound imaging and ultrasound-mediated therapy". Presently it is thought that: "When a microbubble collapses via inertial cavitation, surrounding cell or tissue membranes are ruptured due to the generated jet streaming and shock wave… many researchers have studied this phenomenon, though the exact mechanism is still unclear. Introduced is the notion of cancer cells trapped in air bubbles are protected from effect of chemotherapy agents, thus perpetuating the disease.

2. PROPOSED PARADIGM

Cells trapped in circulating air bubbles could be protected from therapy agents. Cancer cells included, thus potentially perpetuating the disease. Images are presented confirming a yet to be named energy emission in newly identified narrow floating air bubble energy plane.

3. METHODOLOGY

Author's own saliva sample was spitted out onto the center of a clean 25X75x1mm glass slide. The sample was placed and focused on the viewing platform of a video microscope. A toothpick was used to harvest inner cheek cells and gently transfer onto the spitted out sample. After focusing, areas were selected showing floating cells and air bubbles. Different laminar levels were observed ie: Cells migrating at different levels.

The air bubbles were only found when floating in the fluid upper level. While under microscopic examination, the glass slide was disturbed by gently finger tapping, the aim was to induce bubble bursting. In addition, while searching my old files, found an image of air bubbles spontaneously bursting, with prior deformed cells adhered to the intact bubble.

4. RESULTS

Noticed was what could be described as a mutual attraction of cells with the floating outer edge of the bubbles. Cells attached to the bubble's edges had been priorly deformed and attracted to each other. Undeformed cells were seen passing unattracted when in a separate laminar flow under the floating bubble. The provocative tapping causing air bubbles to cavitate and burst as shown. Image showing three air bubbles in tandem spontaneously bursting, notice deformed cells prior to bursting. Unpublished images are introduced of air bubbles attracting and in a rare finding encapsulating a single intact eukaryotic human cell.

5. DISCUSSION

The bursting of an air bubble is a factor in cells deformation. In this manuscript video microscopy and still images are introduced demonstrating a newly found horizontal flat parallel energy field detected in the periphery of the oxygen bubble. This energy evident in the free-floating air bubble interface Hsu et al. (2016) as cheek eukaryotic cells adhere only to the flat round edge of a bubble. Cells are attracted and deformed by the bubble's intrinsic energy. This stored energy is appreciated in selected images from my files, such as in (Figs 1,2,3,4,5). Additionally, images are presented demonstrating that a bursting bubble energy is not the sole

factor in cells deformation. The intrinsic stored energy of the bubble is herein demonstrated to deform eukaryotic cells, this passive deformation may have additional unknown implications when air bubbles are introduced in the human body for the purpose of ultrasound image clarity or therapy. Images are also presented demonstrating trapped cells in an air bubble could be refractory to changes (read chemotherapy) in the external environment (Figs 6,7). Intracellular bursting air bubbles during cell respiration had been theorized to be an additional factor in cancer genesis Krauthammer et al. (2021).

6. AIR BUBBLES IN CANCER

6.1. INTRODUCING PROTECTED TRAPPED CELLS ISOLATED IN AIR BUBBLES AS ADDITIONAL FACTOR IN CHEMOTHERAPY FAILURE

This author found some significant published findings linking air bubbles and cancer, the first documenting "Air Bubble Contact with Endothelial Cells Causes a Calcium Independent loss in Mitochondrial Membrane Potential" Nikolov and Wasan (2019), the second stating," We thus suggest that mitochondrial dysfunction plays a critical role in cancer progression and that targeting mitochondrial alterations and mitochondrial retrograde signaling might be a promising strategy for the development of selective anticancer therapy" Nikolov and Wasan (2019); and the third, reporting that "Mitochondrial retrograde signaling is a major form of mitochondria to nucleus crosstalk, which enables extensive communication between the mitochondria and the nucleus, influencing many cellular and cancer phenotypes including changes in metabolism, stemness, survival, drug resistance and metastasis Relimpio-López and Garrido-Hermosilla (2019). In this manuscript, an additional role of air bubbles is introduced, this being the demonstrated isolation of loose cells by air bubbles.

7. CONCLUSIONS

Introduced are in vitro experiments showing a novel and narrow attachment point of cells and debris onto floating air bubbles. Cheek eukaryotic cells adhering only to a newly identified floating air bubble energy plane are introduced. This author recommends a new factor in chemotherapy failures which is air bubble encapsulation of cancer cells, which could contribute the existing chemotherapy failures rates.

Additionally, introduced is a demonstration of air bubbles trapping normal eukaryotic cells. The question arises: Could cancerous cells be isolated by air bubbles? If so, then herein proposed as being a new factor in chemotherapy failures and possibly cancer cells immortality.

"The Air bubble Intrinsic attraction to circulating cancer cells is herein Introduced as another potential factor in chemotherapy failures."

8. SUPPORTING IMAGES

8.1. PROVOCATIVE MANEUVER TAPPING THE SLIDE CAUSING AIR BUBBLES CAVITATION

8.1.1. RED ARROWS: IMAGE SHOWING DEFORMED EUKARYOTIC (CHEEK) CELLS ADHERING TO FLOATING AIR BUBBLES. BLACK ARROWS: NORMAL CELLS FLOATING IN A DIFERENT LAMINAR LEVEL

Figure 1

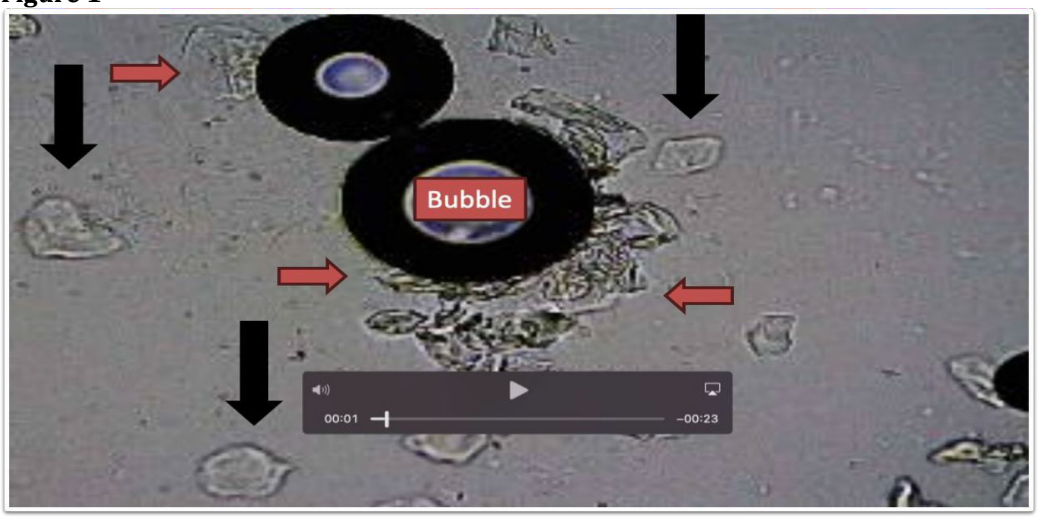

Figure 1 Red Arrows: Bubbles Attracting and Deforming Cheek Cells Adhered to the Bubble.

Black Arrows: Free Floating Undeformed Out of Focus (Different Plane) Cheek Cells Undeformed by the Floating Bubble. Notice Bubble Fluctuation in Size and Brightness Just Prior to Bursting.

Source For Video Details Link to: https://youtu.be/jEdDOGG-T5k

Figure 2

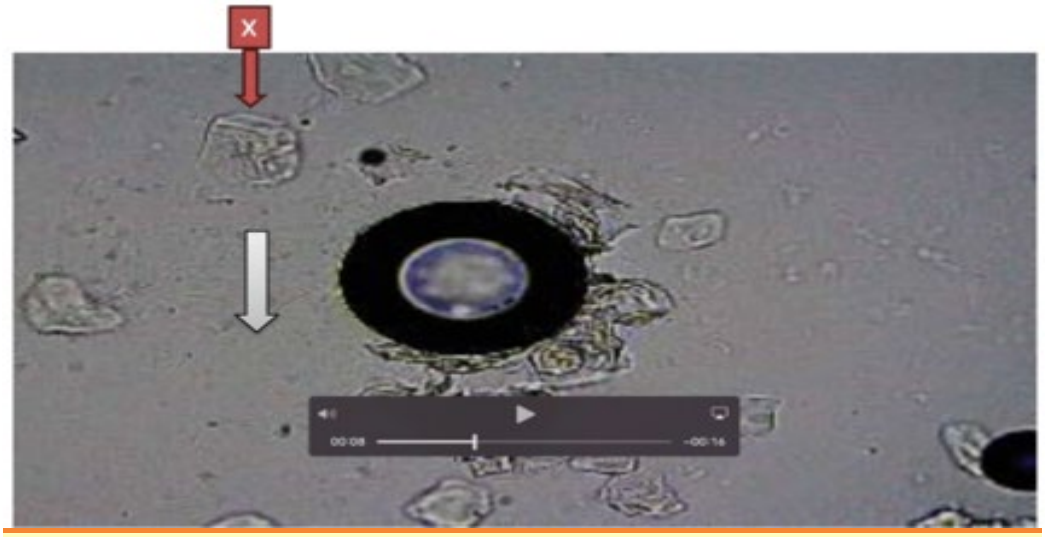

Figure 2 Frame 00:08 Post Small Bubble Burst.

Pink Arrow: Notice Image Field Shift from Bursting Bubble's Energy.

Red Arrow: X Pointing at Detached Deformed Cell from Smaller Bubble Sonoporation.

Source For Video Details Link to: https://youtu.be/jEdDOGG-T5k

Figure 3

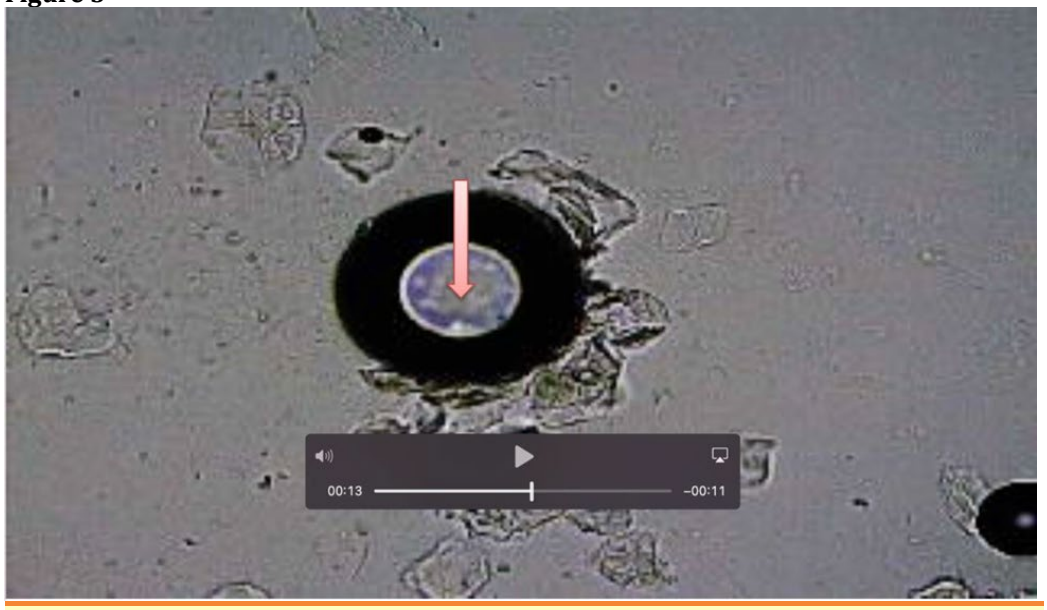

Figure 3 Frame 00:13. Bubble with Eukaryotic Cells Attached Undergoing Cavitation Just Prior to Bursting. Pink Arrow Pointing Increased Brightness Prior to Bursting.

Source For Video Details Link to: https://youtu.be/jEdDOGG-T5k

8.1.2. DEFORMED CHEEK CELLS FIELD POST BURSTING AIR BUBBLES RELEASED ENERGY

Figure 4

Figure 4 Frame 00:14 Post Bursting Bubbles. Red Arrows Pointing at What Appears to be Permanently Deformed Cells Unrelated to Energy Released by a Bursting Bubble. Top Red Arrow Showing Attachment to Smaller Air Bubble.

Source For Video Details Link to: https://youtu.be/jEdDOGG-T5k

9. CELLS DEFORMATION PRESENT PRIOR TO BURSTING

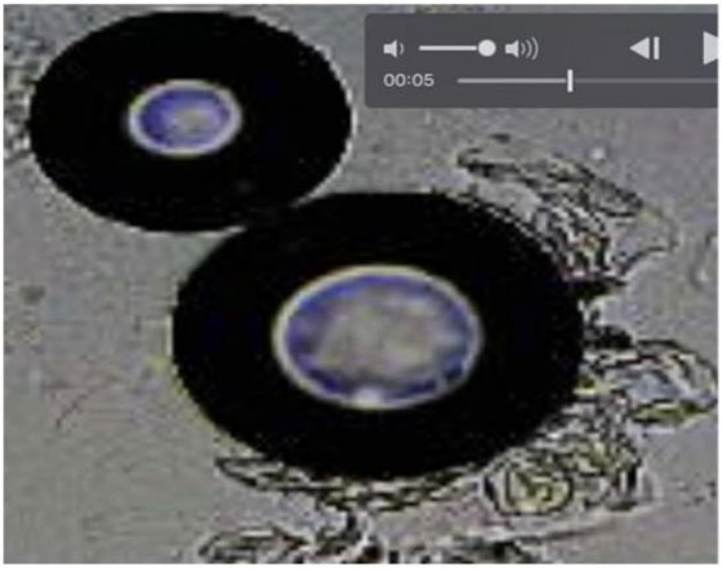

Figure 5 Microphotograph from Video Showing Floating Bubble Bursting Effect on Eukaryotic Cells. Notice Deformed Cluster of Saliva Cheek Cells When Adhered to Bubbles.

10. DEMONSTRATION OF AIR BUBBLE NEST. THE LARGER BUBBLE TRAPPING A CHEEK CELL. (BLUE ARROW)

Figure 6

Figure 6 Image of Air Bubbles Attracting and in a Rare Finding Encapsulating a Single Intact Eukaryotic Human Cell. Implications Unknown. Image from File Obtained while Conducting Experiment Listed Below.

Source https://doi.org/10.29121/granthaalayah.v7.i3.2019.958

11. ADDITIONAL DEMONSTRATION OF SALIVA AIR BUBBLE TRAPPING CHEEK CELLS

Figure 7

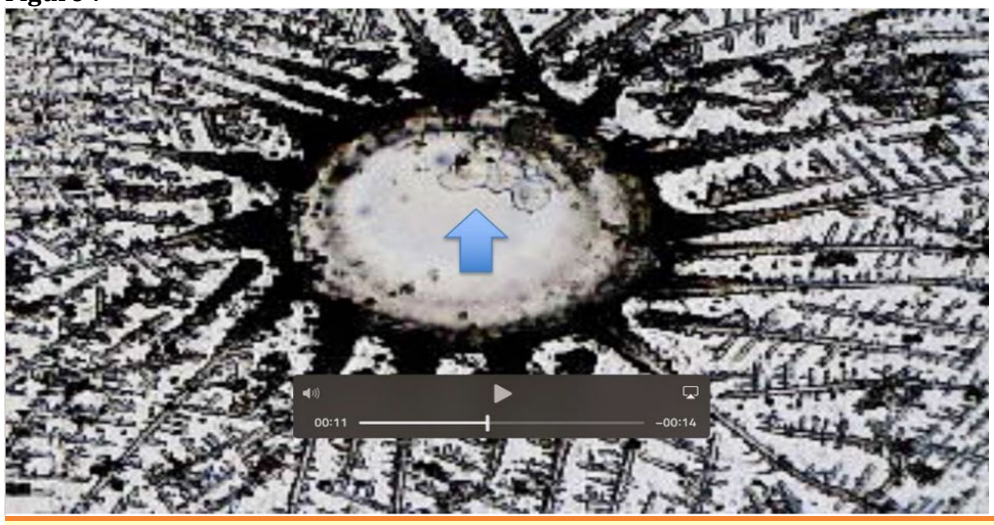

Figure 7 Additional Image Showing Saliva Air Bubble Encapsulating Eukaryotic (Cheek) Cells (Blue Arrow). Also Notice the Bubble Surrounded (Attracting) Dry Saliva Crystals.

Introduced in the literature below are images of eukaryotic cells trapped inside air bubbles post dehydration of human saliva of a glass slide (Figs 8,9,10). Notably, the air bubble shows a peculiar multilayer property. Hypothesized is that this encapsulation could be a factor in cancer perpetuation (8,9).

12. IMAGES POST DEHYDRATION OF HUMAN SALIVA ON SLIDE. INTRODUCING MULTILAYER SPONTANEOUS TRAPPING OF EUKARYOTIC HUMAN CHEEK CELLS POST DEHYDRATION OF SALIVA SPIT ON SLIDE

Figure 8

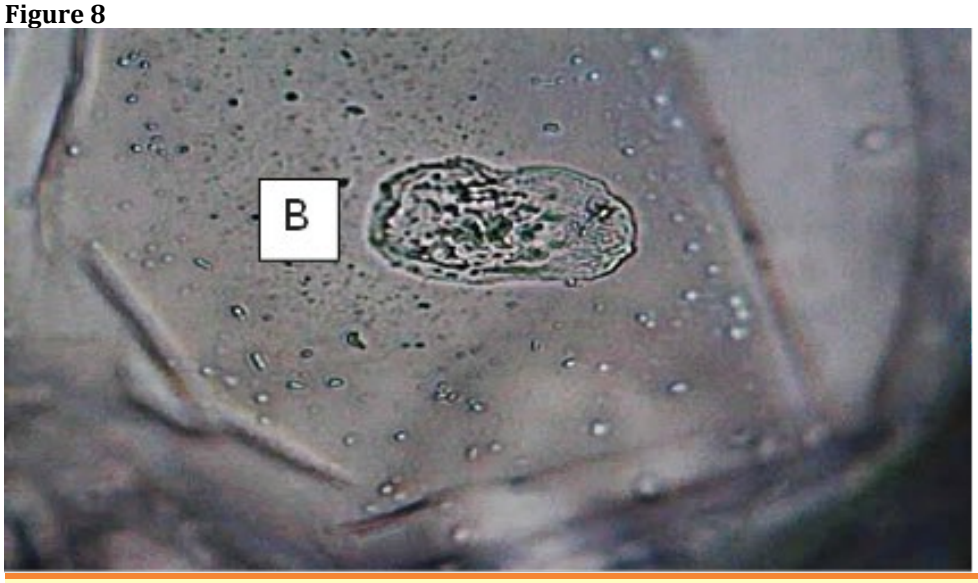

Figure 8 Out of Focus Cheek Eukaryotic Cell Trapped Inside Human Saliva Air Bubble
Source https://youtu.be/dOHrsaudtqc

13. DEMONSTRATION OF SEVERAL FUNCTIONAL LAYERS TRAPPING AND ISOLATING CELLS WITHIN SALIVA AIR BUBBLE

Figure 9

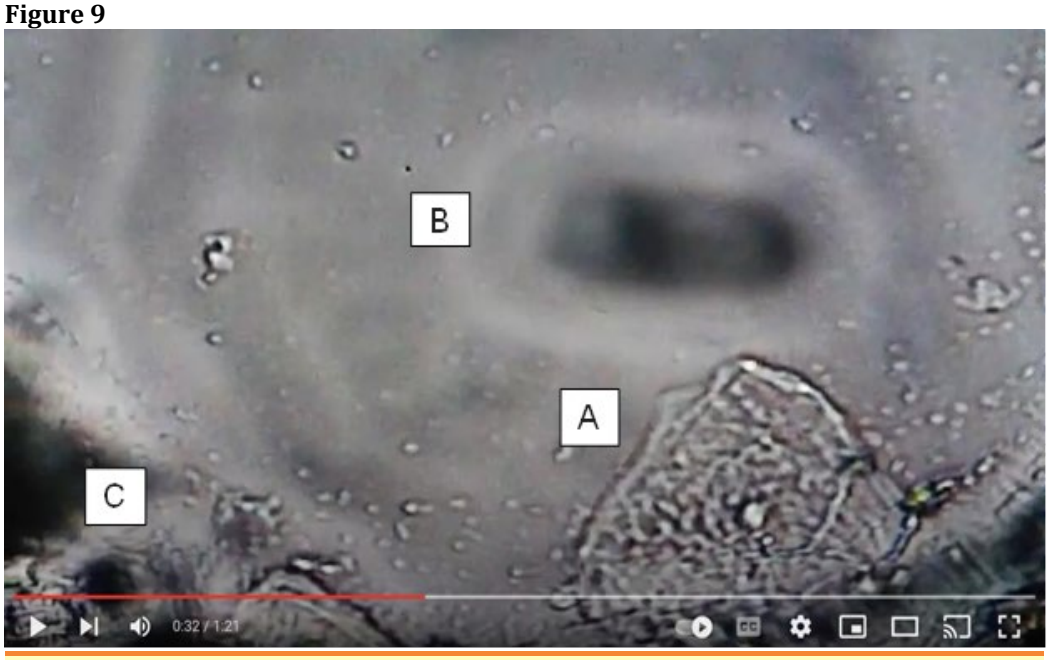

Figure 9 Frame 0:32 of Video-Tape Image Detailing Air Bubbles Showing Two Trapped Inner Human Cheek Cells. A: Level 1 Showing Cell Details. B: Level 2 (out of focus) Indicating Deeper Placement Inside Bubble. C: Round Bubble's Edge.

Source https://youtu.be/dOHrsaudtqc

Figure 10

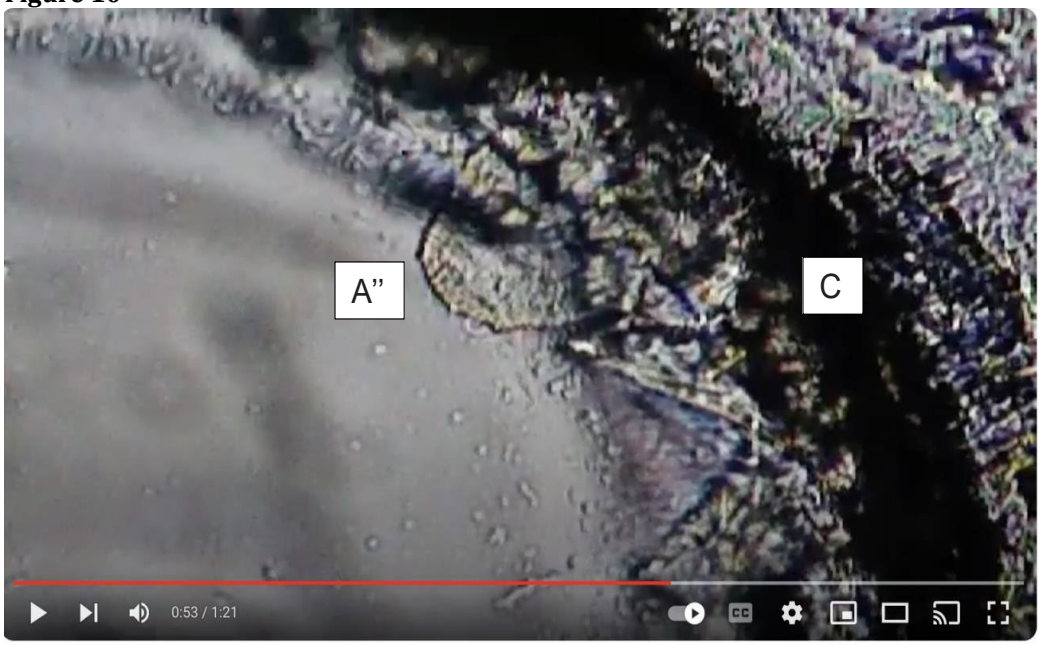

Figure 10 Frame 0:53 of Video Detailing: A'': Second Trapped Cheek Cell Inside Same Bubble. C: Bubble Edge.

Source https://youtu.be/dOHrsaudtqc

CONFLICT OF INTERESTS

None.

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