Original Article
ISSN (Online): 2350-0530
ISSN (Print): 2394-3629

International Journal of Research - GRANTHAALAYAH
July 2023 11(7), 110–119

PROPOSED MECHANISM FOR BREAST CANCER METASTASIS: THE PIERCING AND SUCTIONING OF CANCER CELLS MATERIAL INTO THE INTERCELLULAR SPACE DURING CRYSTALLIZATION

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Received 30 June 2023
Accepted 31 July 2023
Published 15 August 2023

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DOI
10.29121/granthaalayah.v11.i7.2023.5237

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

The purpose of this manuscript is to introduce a hypothesis correlating the process of hydroxyapatite crystallization as a factor allowing for the transfer of intracellular breast cancer matter into the intercellular space by rupturing cellular outer membranes. In addition, this matter could also be transferred into the lymphatic system to be disseminated, thus metastasis. The hypothesis is supported by published in vitro experiments where during crystallization lipid cells are being ruptured by advancing crystals. As fluid evaporates during crystallization, a Backwards Suction (BS) phenomenon of cells and debris has been also documented to occur during crystals formation of the anisotropic Potassium Ferricyanide when within approximately 1 mm of human tissue. This BS during crystals formation is herein hypothesized to be a mechanism dislodging tissue in type II ductal fragile malignant breast cancer tissue. The cellular material would then be pierced by the crystals and suctioned by the lymphatic circulation with its consequences.

Keywords: Crystallization Factor, Backwards Suction, Microcalcifications Genesis, Breast Cancer Metastasis, Hydroxyapatite, Lymph Nodes

GLOSSARY

Anisotropy: Anisotropy is the property of being directionally dependent, as opposed to isotropy, which means homogeneity in all directions.
Backwards Suction: Matter suctioned at end of crystallization.
K3Fe: Acronym for Potassium Ferricyanide.
Paramagnetic: Attraction to incoming electromagnetic radiation ie: Potassium Ferricyanide.
SSP: Single Slide Preparation. Matter to be tested placed on surface of glass slide.

1. INTRODUCTION

The presence of calcified matter observed in breast biopsies, are classified by their physical size, and having unknown origins, to the point of researchers attributing the calcification material itself as a factor in enhancing malignant potentials Haka et al. (2002). In this manuscript basic science *in vitro* experiments are presented proposing a mechanism supporting microcalcifications in ductal breast cancer type II tissue as *essential for metastasis*, as follows:

2. IN *VITRO* BACKWARDS SUCTION DURING CRYSTALS FORMATION

The images and video shown below are representative of the Backwards Suction Phenomenon. This was reported and hypothesized at the time to be a factor in the genesis of coronary artery disease (Figure 2, Figure 3), the additional figures (Figure 4, Figure 5, Figure 6, Figure 7, Figure 8) demonstrate the backwards suction effect on tissue, supporting the effect of crystals piercing lipids membranes, thereby the proposed hypothesis Embí (2020).

2.1. THE HYPOTHESIS STATED

"Hydroxyapatite crystals are a malignancy enhancement agent in type II ductal breast carcinomas, by piercing cells' outer membranes and spilling material into the intercellular space. This material could then be transported by the lymphatic system with its consequences." (Diagram Figure 1)

2.2. PROPOSED DUCTAL BREAST TYPE II CARCINOMA METASTASIS UNDERLYING MECHANISM

Figure 1

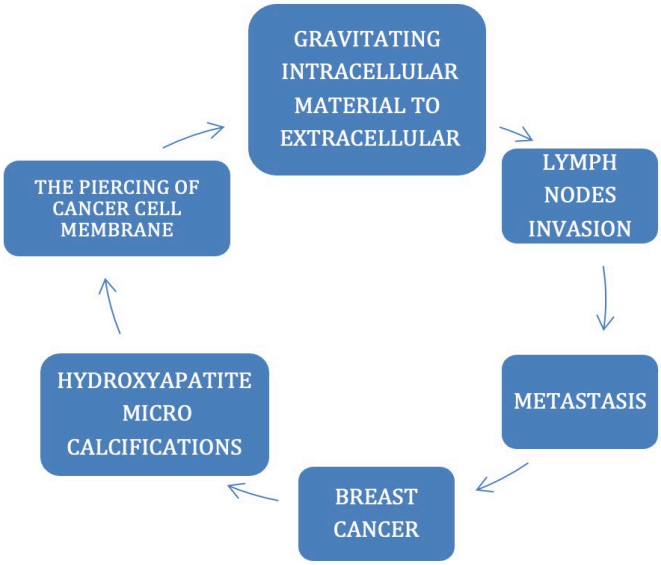


Figure 1 Proposed Mechanism for Breast Cancer Ductal Type II Metastasis.

3. MATERIALS AND METHODS

3.1. MATERIALS

1) Potassium Ferricyanide Crystal. $K_3Fe(CN)_6$.
   CSA # 13746-66-2.
2) Hair Follicles plucked via tweezers from author's scalp
3) Microscope glass slides: 25x75x1mm thickness. Pearl Cat. No. 7101

4) Room relative humidity monitored by an ACU-RITE sensor model # 01536
5) Digital Video Microscope Celestron II model # 44341, California, USA.
6) Images downloaded to an Apple Computer MacBook Pro Photo Application.
7) Human lipid droplets.
8) Lizard tail lipid droplets.

3.2. METHODS

3.2.1. PREPARING THE SOLUTION

A solution was prepared by diluting ≅ 2 grams of Potassium Ferricyanide (K_3Fe) crystals in 2 ml of the previously tested for impurities bottled spring water. The solution was placed inside a 6-inch 4 mm OD glass tube and withdrawn as needed.

3.2.2. THE SINGLE SIDE PREPARATION (SSP)

The SSP is an open-air technique where freshly plucked *in toto* human hairs were placed on a clean 25x75x1mm glass slide; and covered by drops of K_3Fe in solution; the liquid was then allowed to evaporate. Prior to evaporation, the drops were gently touched by a wooden toothpick and dispersed to cover the follicle and shaft. After the hair sample stops drifting and stabilizes, a clean wooden toothpick was used to gently shepherd the hair sample away from the drop edges. As evaporation starts, images and video recordings are recorded and stored.

4. PROCEDURES

Spontaneous detachment of a small lizard tail allowed for placing small segments on a glass slide. Two drops of diluted Potassium Ferricyanide in water covered the sample, as the Ferricyanide evaporated, crystals formed, and some penetrated the lipid samples (Figure 5, Figure 6, Figure 7, Figure 8, Figure 9). The figures showing human lipid droplets were reproduced from previous papers (Figure 2, Figure 3, Figure 4).

4.1. DEMONSTRATION OF EXTERNALLY TRAPPED ATTRACTED SOLID HUMAN TISSUE PARTICLES DURING CRYSTALS FORMATION.

Since most breast cancers are classified as solid tumors; and human hair follicles are a cohesive solid miniorgan, the process of crystals formation near solid tissue has been demonstrated to suction cellular material from hair follicles. The tissue particles are documented being trapped by the crystals (Figure 2, Figure 3), creating a complex type of crystals. The hypothesized "complex type" of hydroxyapatite (HA) reported in Type II breast cancer is supported by published evidence as stated: "Although type II microcalcifications are primarily composed of calcium hydroxyapatite, they also contain trace amounts of several biological impurities…… *On the basis of these results, we believe that type II microcalcifications formed in benign ducts typically contain a larger amount of calcium carbonate and a smaller amount of protein than those formed in malignant ducts" (Cox and Morgan (2013), Gosling et al. (2019)).* Based on the data herein presented, it could be stated

that the type II calcifications contain externally trapped material (between crystals) (Figure 4).

4.2. PRIOR ACTUAL PUBLISHED IMAGES AND VIDEO RECORDINGS

Figures 2,3,4 reproduced from: Abrahám A. Embí BS MBA. (2020). Introducing Crystallization Backward Suction Trapping Lipids and Debris as Proposed Additional Factor in The Genesis of Coronary Artery Disease. International Journal of Research -GRANTHAALAYAH, 8(9), 215-233. https://doi.org/10.29121/granthaalayah.v8.i9.2020.1174

Figure 2

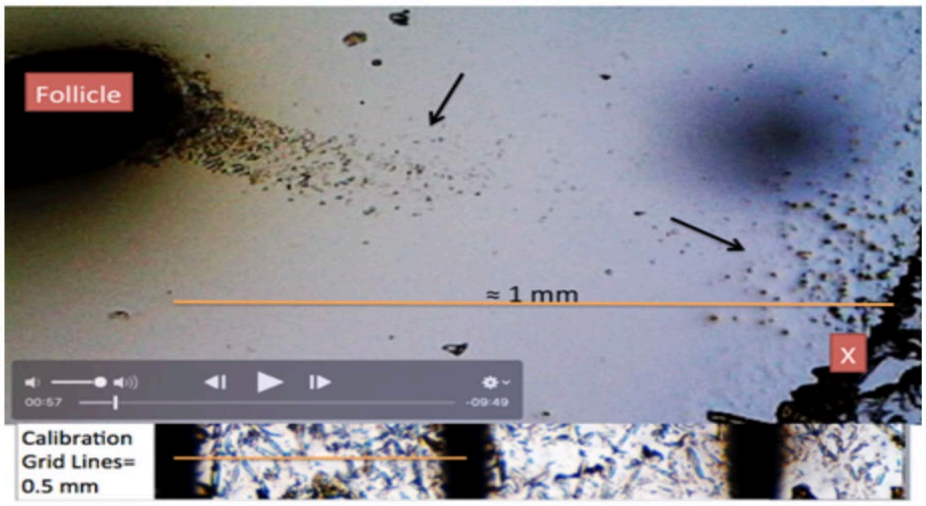


Figure 2 Showing Lower Right Corner X: Video-Frame 00:57". Crystals Formation Attracting Particles from Human Tissue (Hair Follicle).

Figure 3

Figure 3 Amplified Image Showing the Process of Crystallization When Near Solid Human Tissue Attracting Particles (Lipids and Debris). Frame 1:15 of Video Recording Showing Hair Follicle Molecules Attracted Towards Evaporating Potassium Ferricyanide During Crystals Growth Stage. For Additional Video Details Please Link to: **https://youtu.be/Kv1rRdNwuF4**

Figure 4

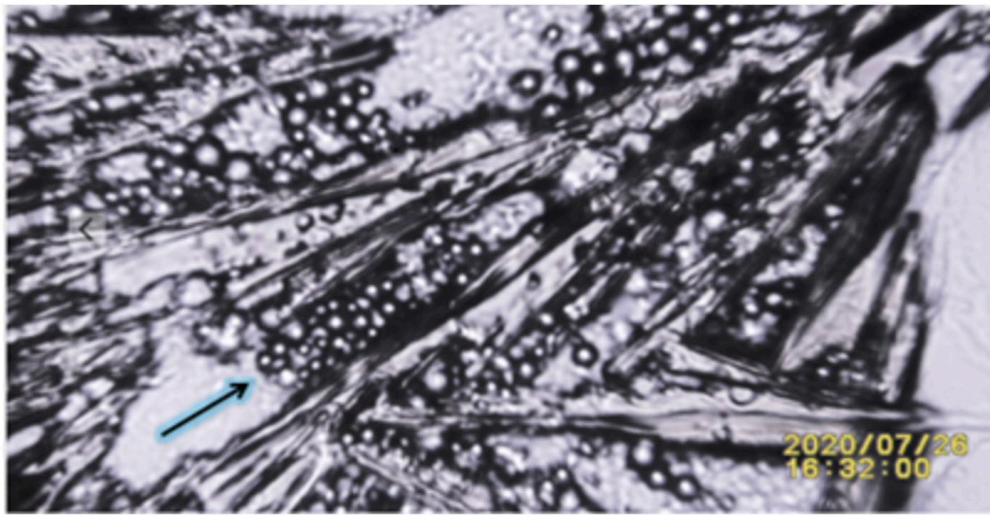


Figure 4 Image from SSP in Vitro Experiment Where During the Process of Crystallization of Potassium Ferricyanide When Close to Solid Human Tissue (Hair Follicle) Particles are Suctioned and Trapped. Hypothesized to also Occur from Malignant Ducts Crystals. Supporting Observation Addressed in References (**Haka et al. (2002)**, **Cox and Morgan (2013)**) as follows:

"On the basis of these results, we believe that type II microcalcifications formed in benign ducts typically contain a larger amount of calcium carbonate and a smaller amount of protein than those formed in malignant ducts."

4.3. FIGURE 5, FIGURE 6, FIGURE 7 FROM PREVIOUS RESEARCH DEMONSTRATING CRYSTAL PIERCING LIPID DROPLET MEMBRANE

Embi AA. (2023) Introducing Electromagnetic Energy from Hydrocolloid Wound Dressing Paste Penetrating a Glass Barrier Disrupting Human Skin Lipid Droplets Size and Membranes: Possible Implications in Cancer Cells Genesis and/or Cure. International Journal Research Granthaalayah. *11(2), 47-54.* doi: 10.29121/ Granthaalayah.v11. i2.2023.5032

Figure 5

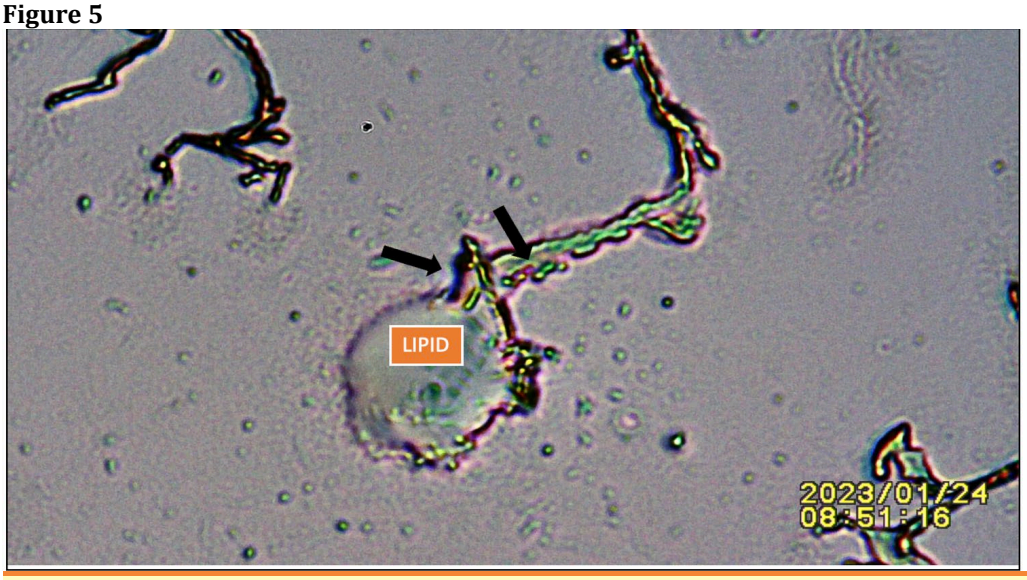


Figure 5 Showing Lipid Droplet Punctured by Advancing Potassium Ferricyanide Crystal. Black Arrows: Pointing at Lipid Droplet Draining into Advancing Crystal.

Figure 6

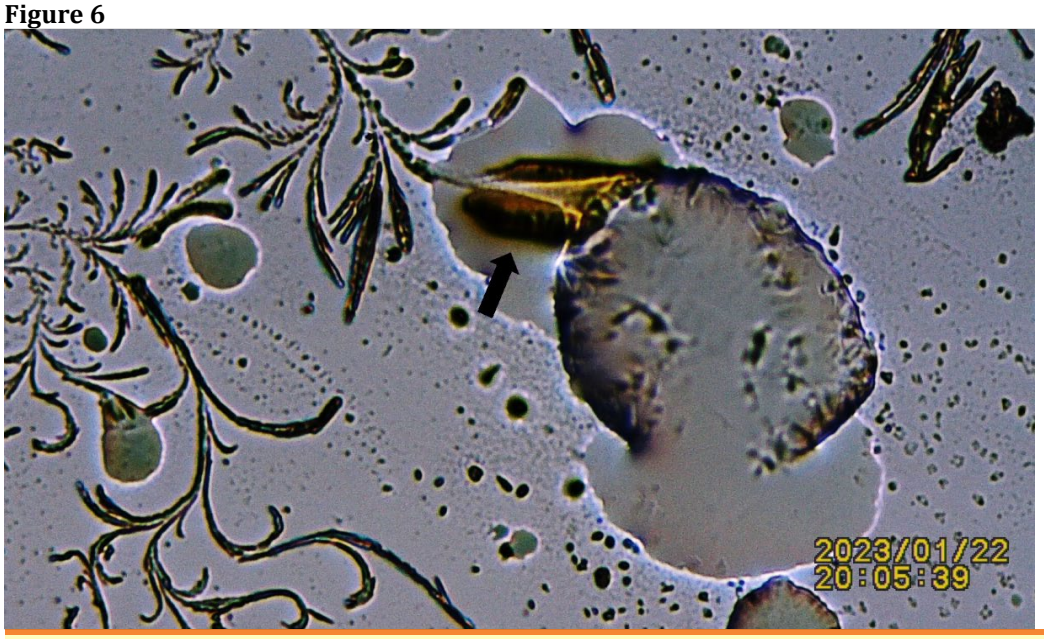


Figure 6 Additional Figure Showing Advancing Crystals Perforating Lipid Droplet. Black Arrow: Notice the Appearance of an Electrical Discharge between Lipid Droplet and Advancing Crystal.

Figure 7

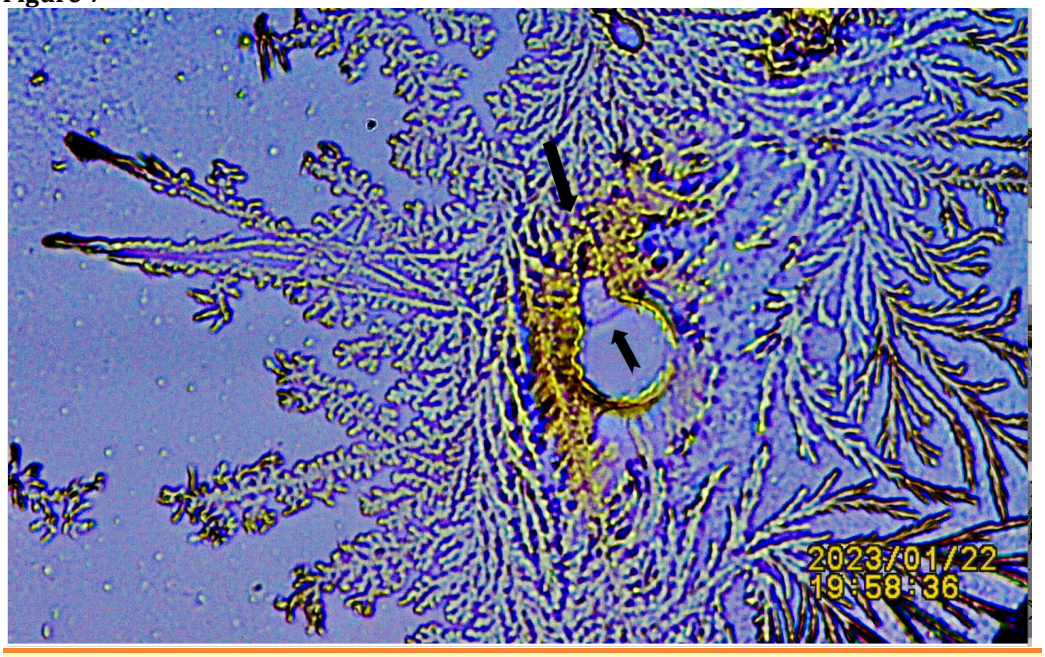


Figure 7 Additional Demonstration of Lipid Droplet Trapped and Perforated by Crystals. Notice the Staining of Crystals Possibly Caused by Spilled Lipid Fluid.

4.4. THE FOLLOWING IMAGES (FIGURE 8, FIGURE 9) ALSO REPRODUCED FROM PREVIOUS RESEARCH.

Embi, A. A. (2022). Introducing Methodology to Detect Dead Tissue Stored Energy. *International Journal of Research - GRANTHAALAYAH, 10*(8), 20–29. doi: 10.29121/granthaalayah.v10.i8.2022.4733

Figure 8

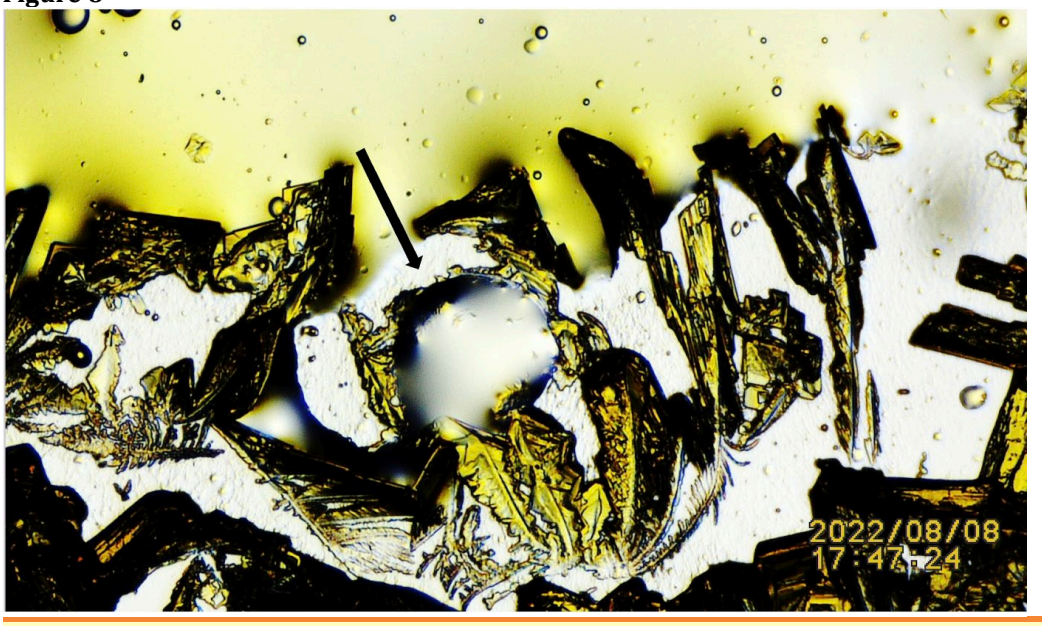


Figure 8 N:1 Black Arrow: Pointing at Potassium Ferricyanide Crystals Penetrating and Spilling Harvested Lizard's Lipid Droplet. For Additional Details Link to:

Video link **https://youtu.be/zoPhBH_-fHc**

Figure 9

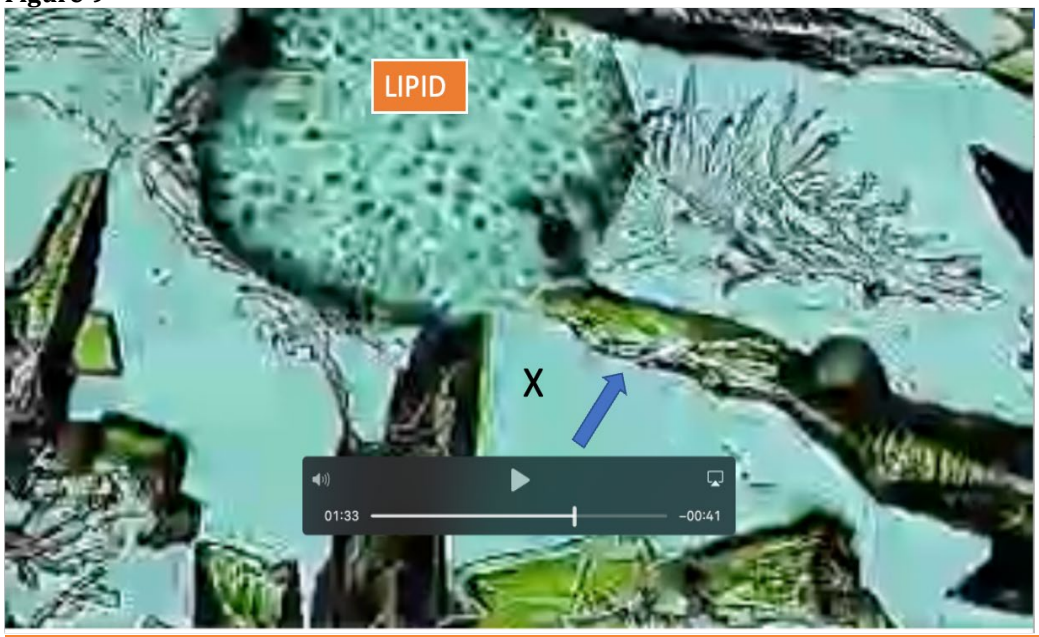
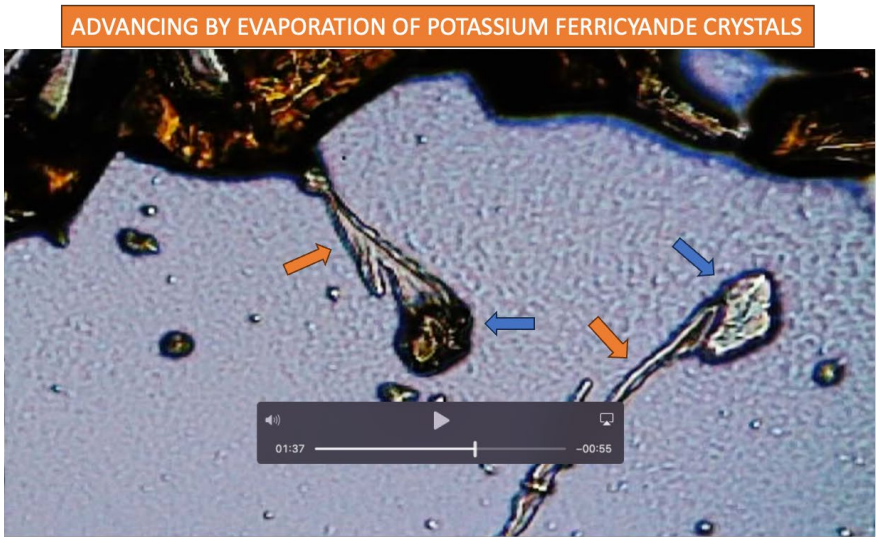


Figure 9 N;2 Frame 01:33 from Video Showing: Blue Arrow: Amplified Potassium Ferricyanide Crystals Attracted to Lipid Droplet Perforating Membrane. X: Spilled Intralipid Material. for Additional Details link to**:** **https://youtu.be/zoPhBH_-fHc**

Exhibit 1



Demonstration of Potassium Ferricyanide crystals attracted to lose biological lizard tail fragments Red Arrows: Advancing Potassium Ferricyanide Crystals. Blue Arrow: Lizard Tail Lose Fragments.

Exhibit 1 Additional Experiment Demonstrating Affinity Of Potassium Ferricyanide Crystals Towards Lose Tissue Fragments.

Please link to video frames 1:21 thru 1.37 for further details.

Please note when crystals attached to tissue triggering a noticeable spontaneous energy discharge to the point of changing image depth of field (focusing.

https://youtu.be/Y97sT0r8-WQ

5. SUMMARY

The data presented in this document supports a hypothesis whereby the process of Hydroxyapatite crystallization in breast tissue induces a backwards suction attracting detached breast cancer cells that are then pierced causing it to shed protein and biological impurities into the intercellular space. This crystallization process was duplicated *in vitro* using liquid Potassium Ferricyanide and selecting freshly plucked human tissue (hair follicles) as sentinels. Potassium Ferricyanide was chosen due to the crystal's pointed tip mimicking hydroxyapatite crystal, thus able to penetrate cells membranes, as well as having the property of absorbing incoming energy (electromagnetic) as shown in (Figure 8, Figure 9), where crystals are attracted to the energy from lipid droplets. In addition, hydroxyapatite, and Potassium Ferricyanide are both classified as being paramagnetic and anisotropic, thus adding credence to the stated hypothesis in this manuscript (B. Viswanath et al. (2007), B. N. Figgis et al. (1969)). Those experiments also support published evidence where in breast cancer tissue the calcification "crystallite size and non-uniform strain normal to basal planes increased significantly with malignancy". Additionally, the findings herein presented could also support a published notion of Hydroxyapatite crystals as a malignancy enhancement agent He et al. (2019). Occurring by piercing breast cancer cells and spilling its contents in the intercellular space as shown in Figure 5, Figure 6, Figure 7, Figure 8, Figure 9.

Please also note Exhibit 1 demonstrating advancing Potasium Ferricyanide crystals being selectively attracted towards biological tissue droplets. This material

could then be transported by the lymphatic system with its consequences. Additionally, a second statement could be stated as follows: "Based on the data herein presented, it could also be stated that the type II calcifications contain externally and internally trapped material inside crystals" (Figure 4, Figure 5).

6. CONCLUSION

Concluded is that the data presented in this document supports a proposed mechanism whereby Hydroxyapatite crystallization in malignant type II ductal breast carcinoma tissue induces a backwards suction resulting from the piercing of malignant cells, causing the shedding of protein and biological impurities into the intercellular space. This material could then be transported by the lymphatic system with its consequences, including additional kidney failure Castellanos et al. (2008).

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

The author acknowledges the contribution of Mrs. Laura Embí Sánchez in proofreading the manuscript.

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