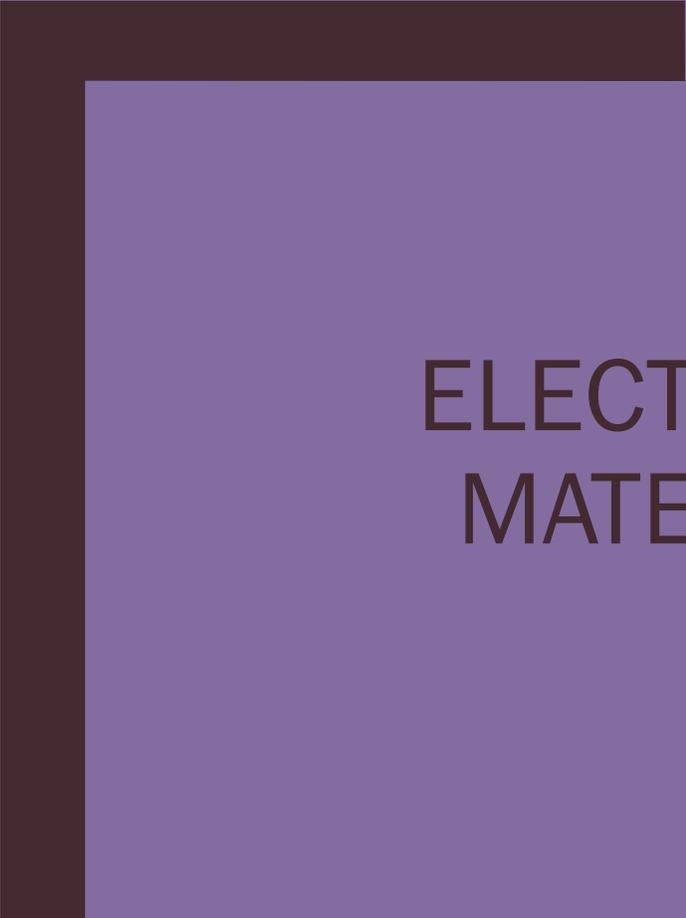




TREVECCA
NAZARENE UNIVERSITY



ELECTROLYSIS TREATMENT IN MATERNAL BREAST CANCER

By: Lindsay Stine and Jose Paz



Main Concepts

- Also known as Electrochemical Treatment (ECT).
- Multiple electrodes are placed into a tumor and a current is passed between them.
- Tumor cell death is caused by ion mobility, pH change, and disruption of cell communication.

Background

- Electrolysis treatment was common before antibiotics were regularly used.
- ECT is a normal practice in veterinary medicine.
- It is a common form of treatment in China.

Maternal Breast Cancer

- 1 in every 3000 women will be diagnosed with breast cancer during pregnancy.
- Women 32 to 38 years old are the most likely to develop breast cancer due to pregnancy.
- Due to the change in breast anatomy, tumors are often not found until they have progressed into late stages.
- Treatment options are limited. Currently, maternal breast cancer is treated with low dose chemotherapy or surgery. Treatment may be postponed until fetal viability age.
- All treatment options significantly increase the risk of miscarriage and still births.
- Abortion does not significantly increase chances of survival for the mother.
- Maternal mortality rates are high.

	Nonpregnant Woman	Pregnant Woman
Estiol	0.002-0.1 mg/24 Hours	50-150 mg/24 hours
Estridiol-17 β	0.1-0.6 mg/24 hours	15-20 mg/24 hours

Benefits of Electrolysis Treatment

- Electrolysis treatment is administered under local anesthetic.
- Typically only one treatment is needed.
- Metastasis is unlikely.
- Other treatment can be applied immediately following ECT.
- Virtually painless and easy to recover from.
- It is unlikely to significantly impact a fetus.

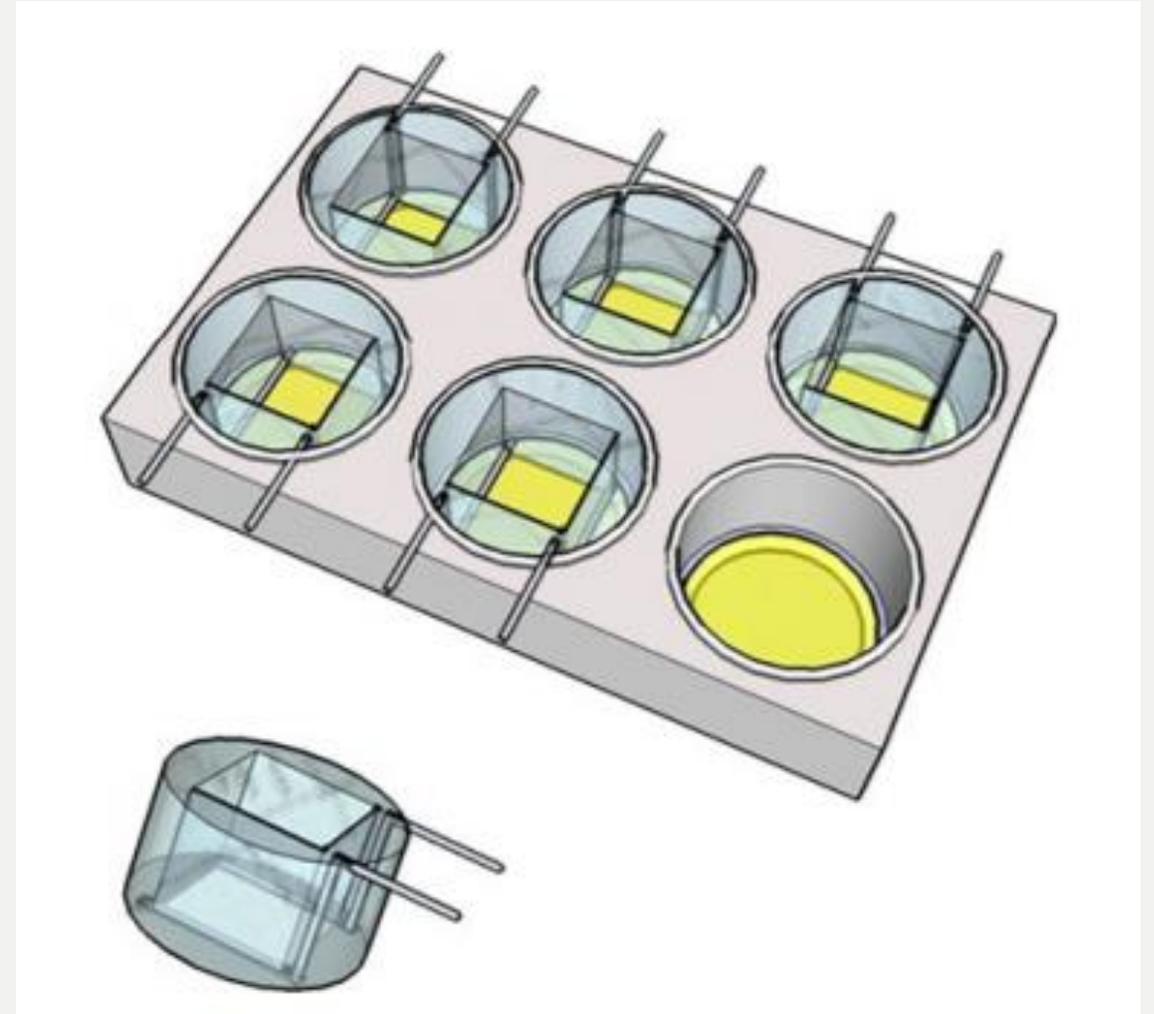
Primary Article: *Time-Dependent
Micromechanical Responses of Breast
Cancer Cells and Adjacent Fibroblasts
to Electric Treatment*

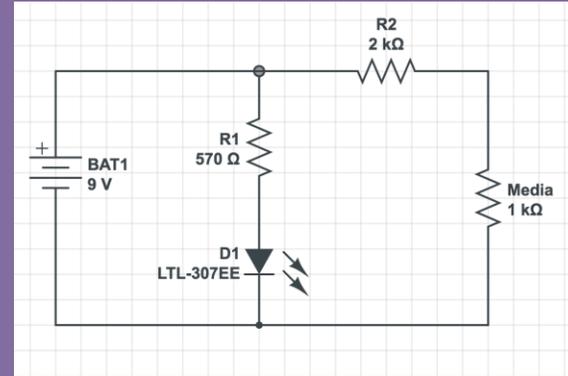
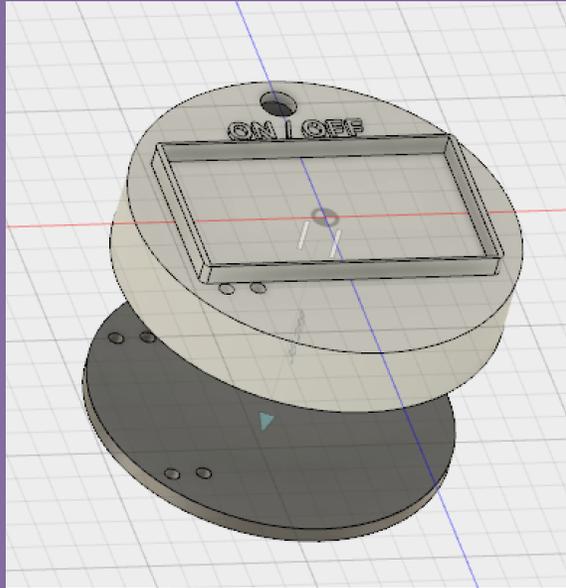
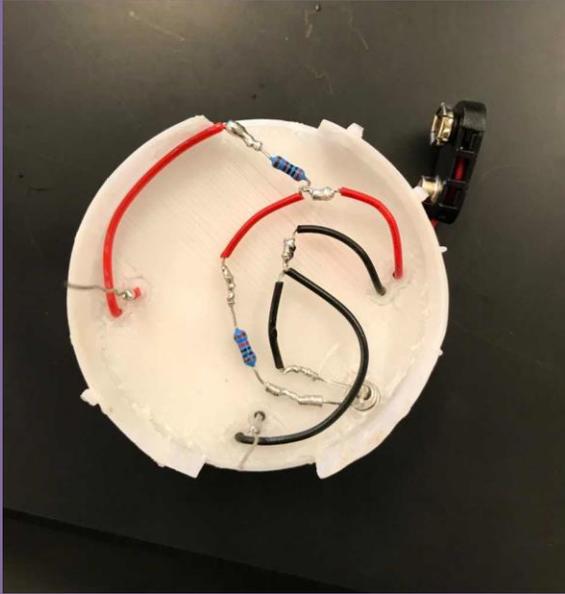
Mayan Lia Israeli and Daphne Weighs

August 2, 2011

Electrolysis treatment using plated cells.

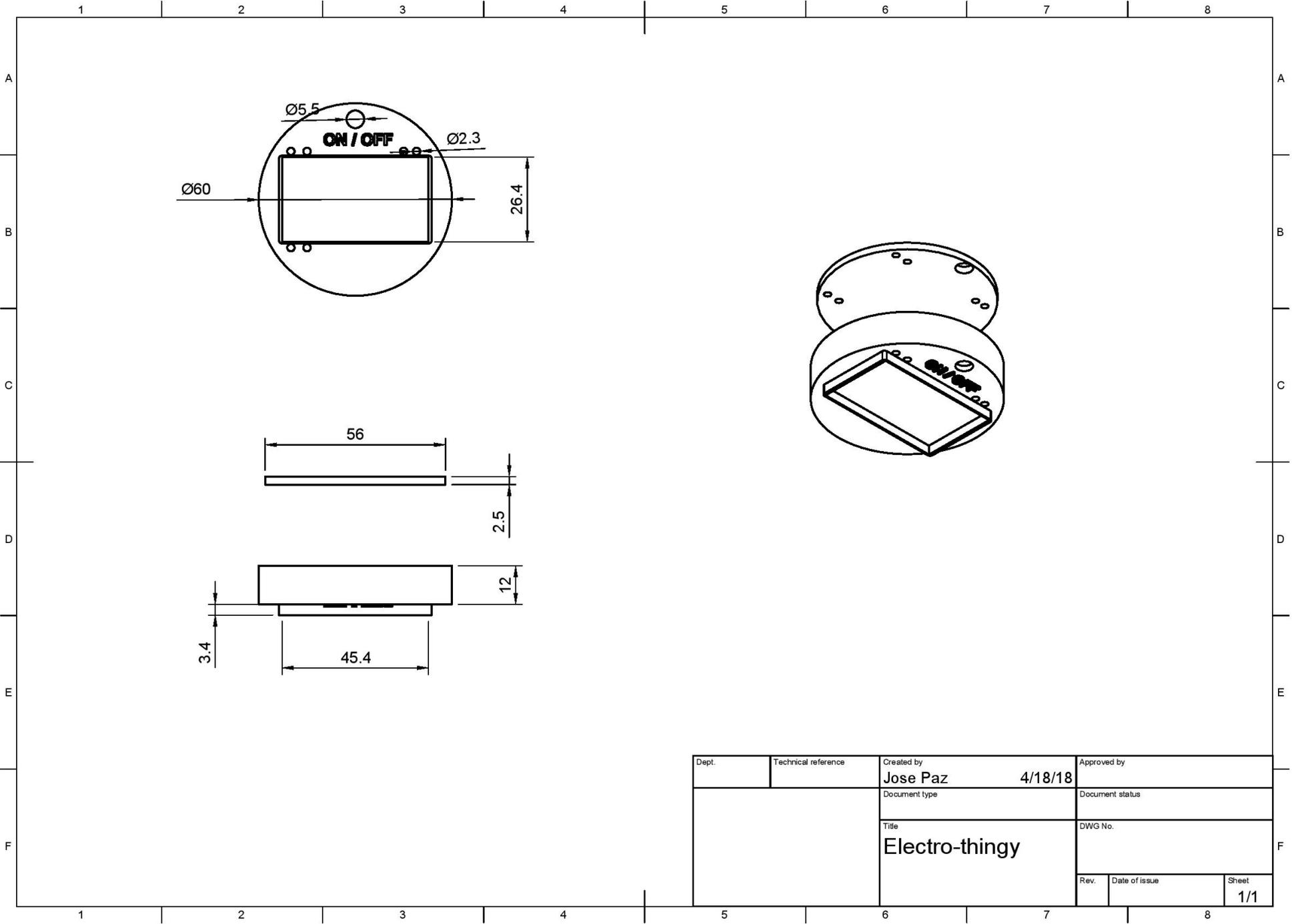
- Six well plate.
- Polycarbonate Inserts.
- Platinum electrodes.
- DC-Power source.
- A 3 volt current was applied for 8 minutes to a $15 \times 15 \text{ mm}^2$ area.



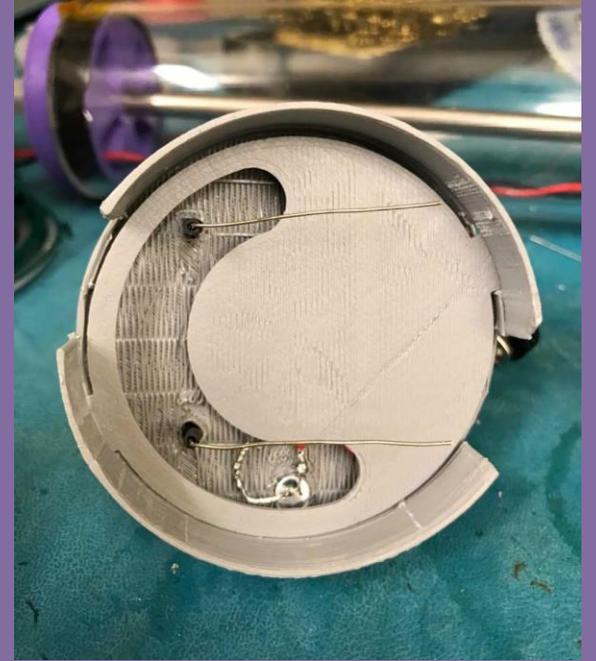
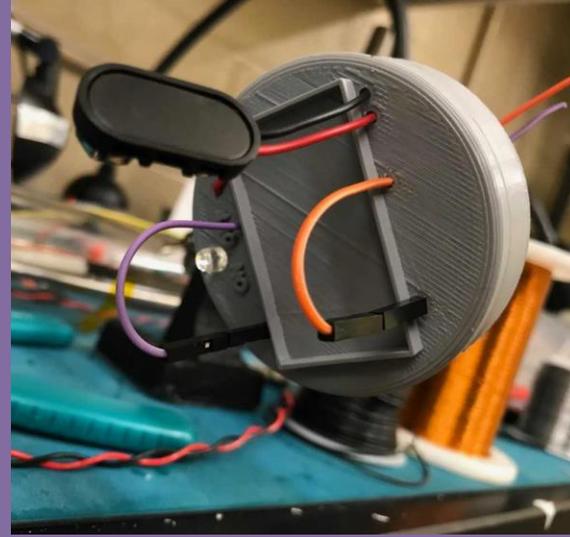
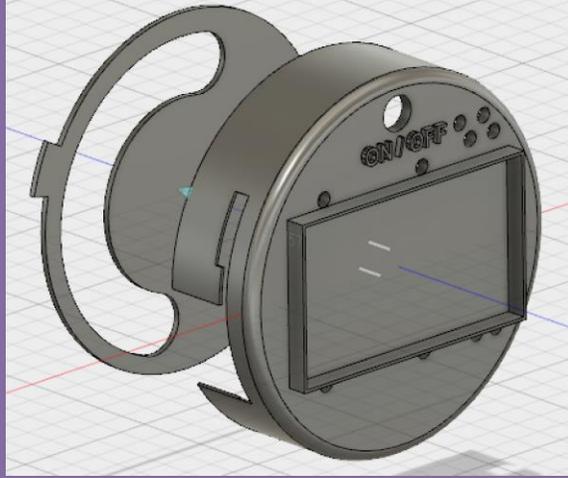
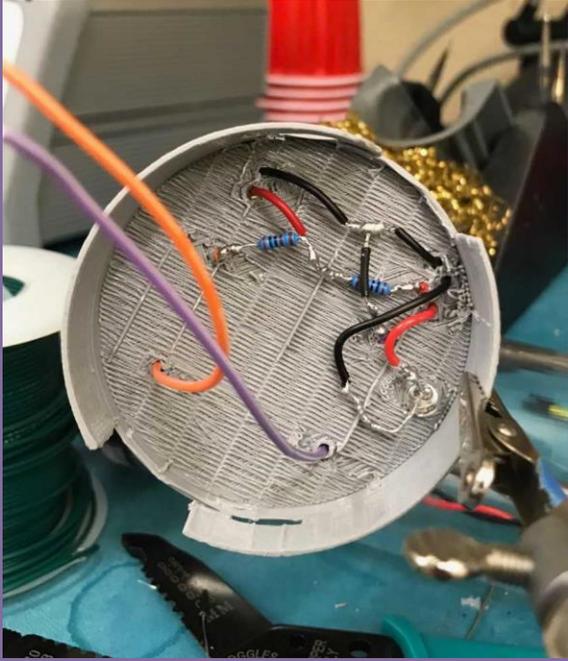


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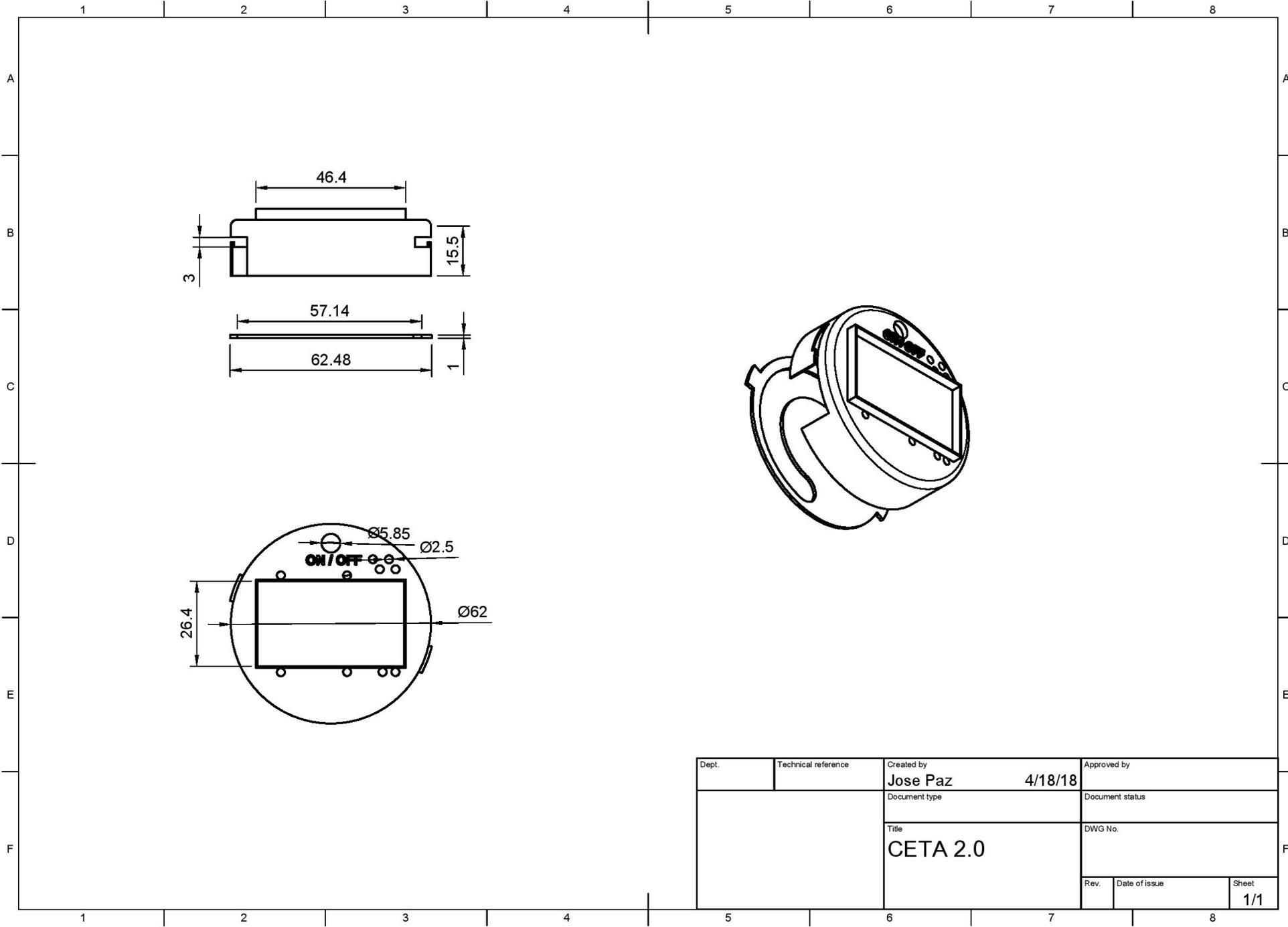


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		Document type		Document status
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		Rev.	Date of issue	Sheet 1/1



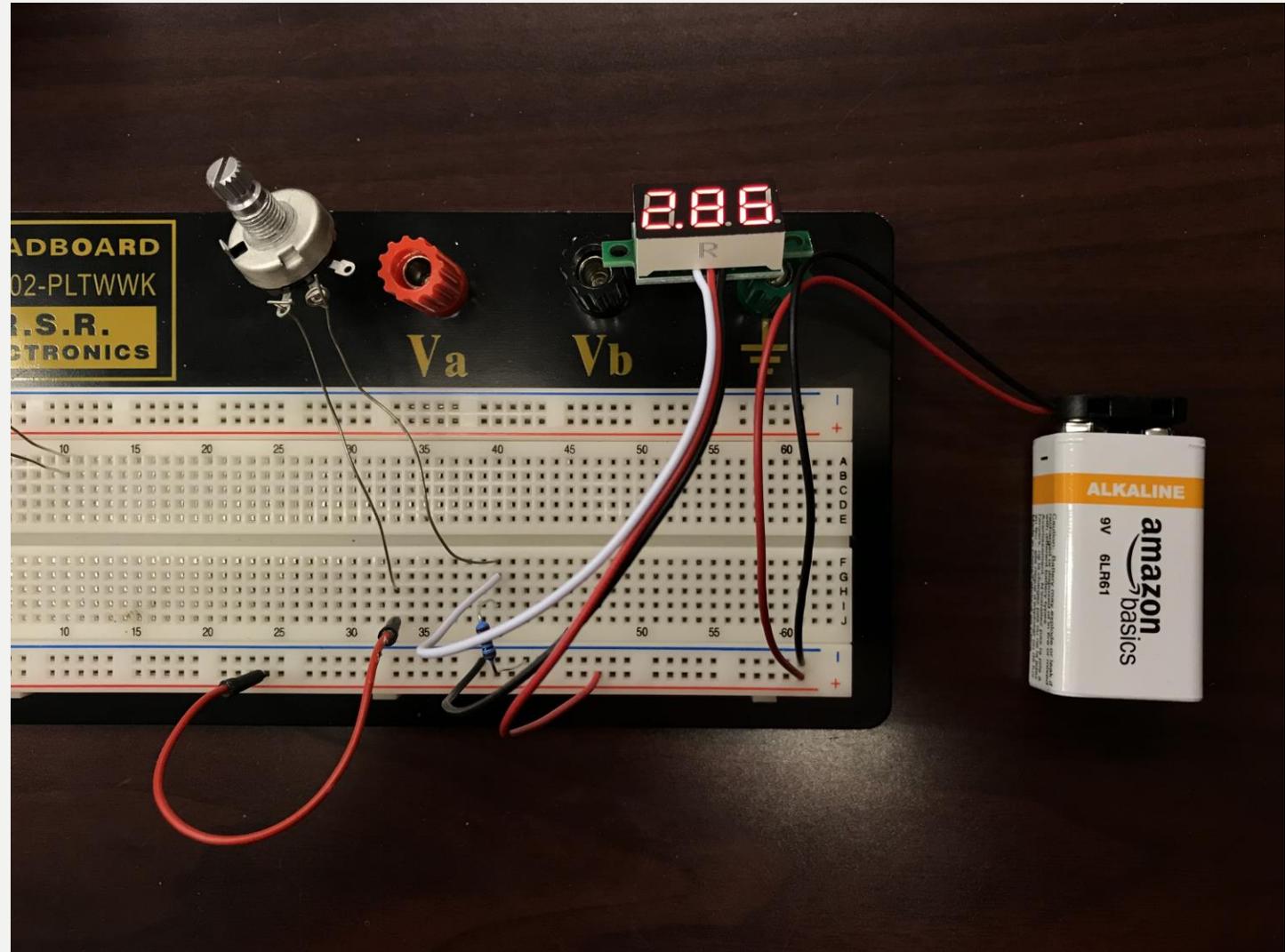
CETA 2.0

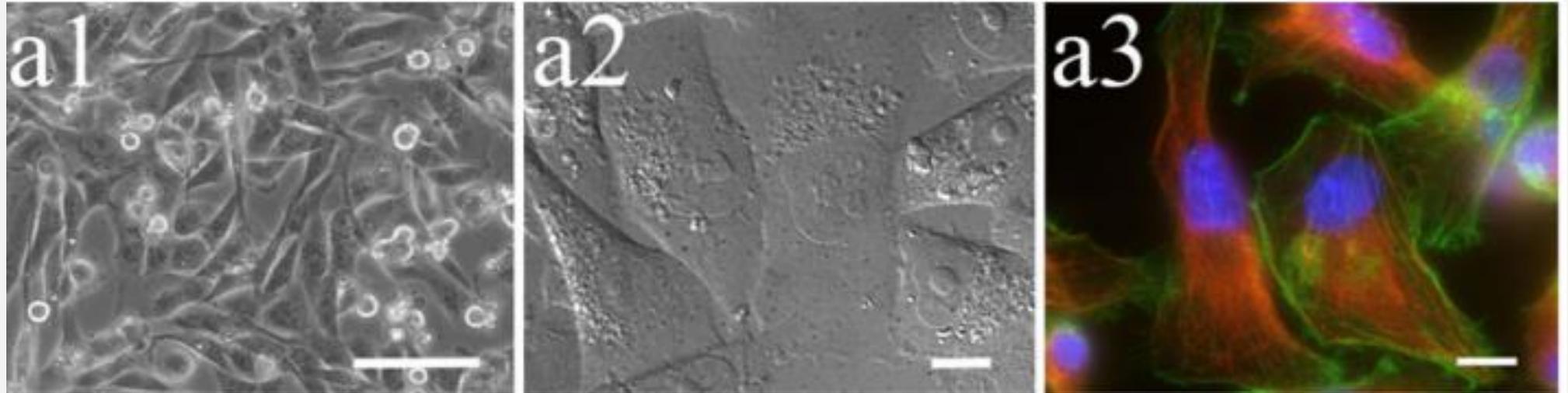




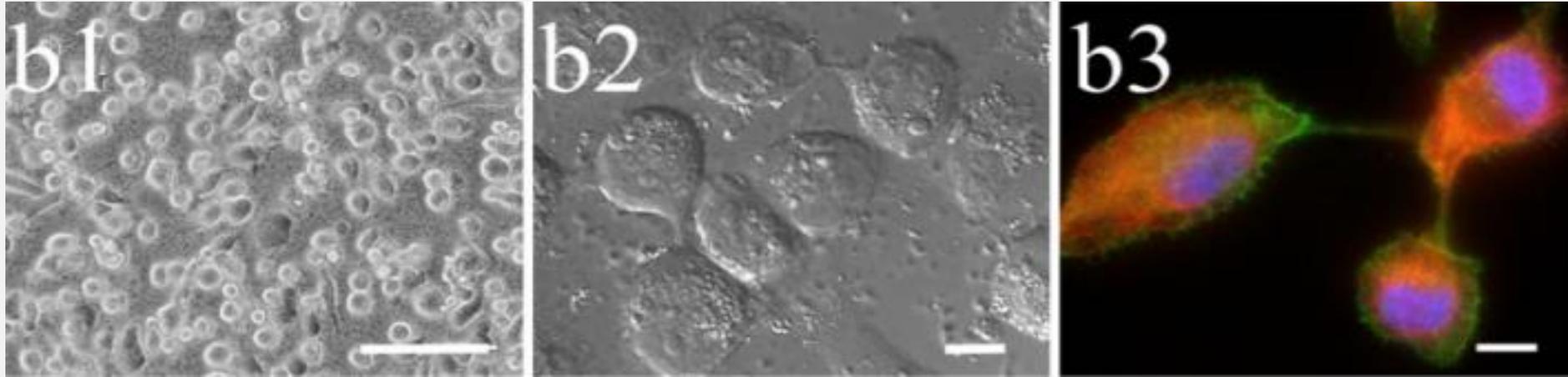
Dept.	Technical reference	Created by Jose Paz	4/18/18	Approved by
		Document type	Document status	
		Title CETA 2.0	DWG No.	
		Rev.	Date of issue	Sheet 1/1

CETA 3.0

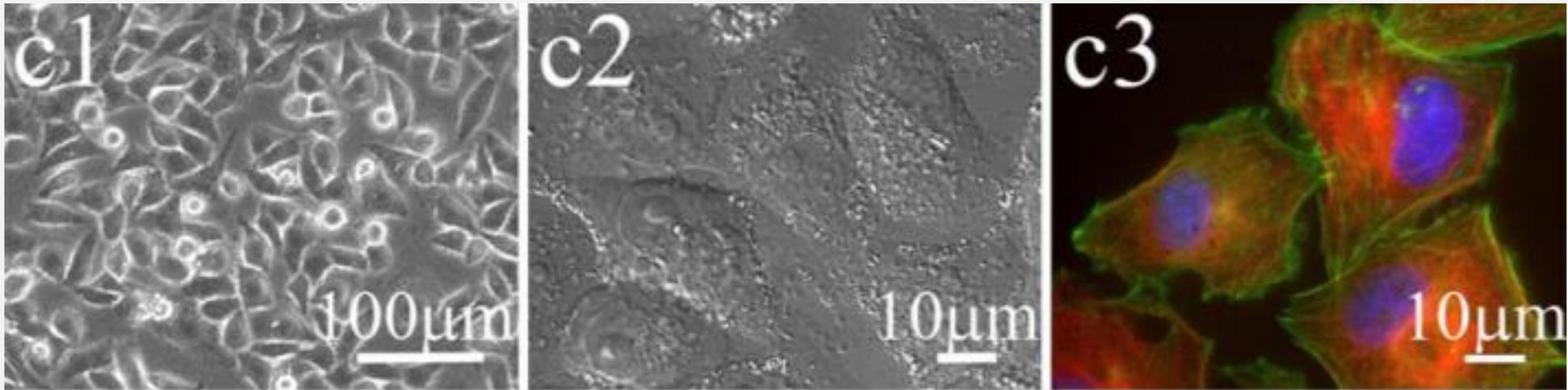




Cancer cells prior to treatment.



25 minutes after treatment, the cells exhibit loss of anchorage and “ball up.”

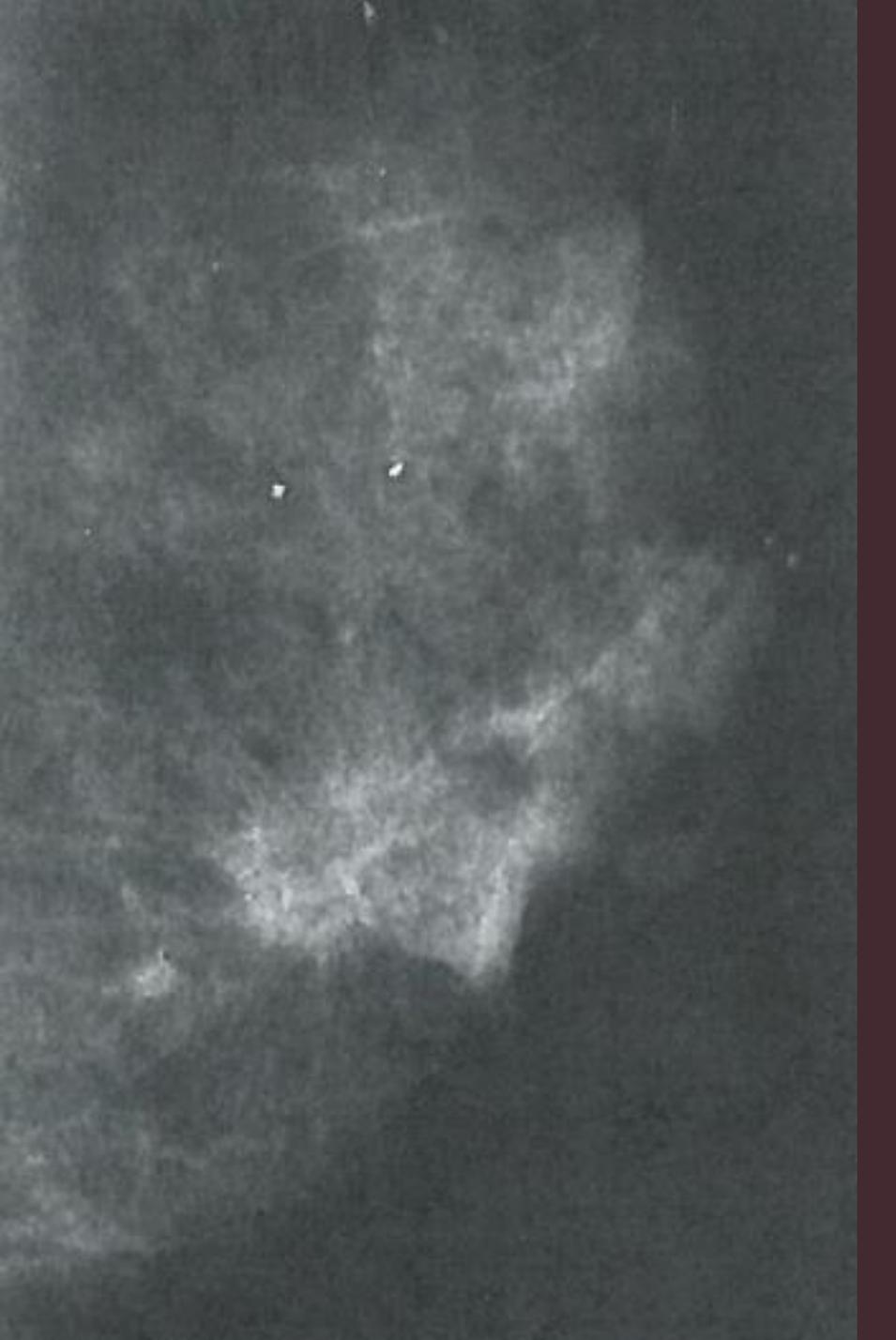


2 hours after treatment, cells have regained normal shape and show signs of death.

- Proliferation of neoplastic cells was reduced by 45% after first treatment.
- Adjacent normal tissue did not show significant cell death.
- There is a window of cell adhesion disruption during which chemical treatment can be applied.

Secondary Article:
Radiological Evidence of Response to
Electrochemical Treatment of Breast
Cancer

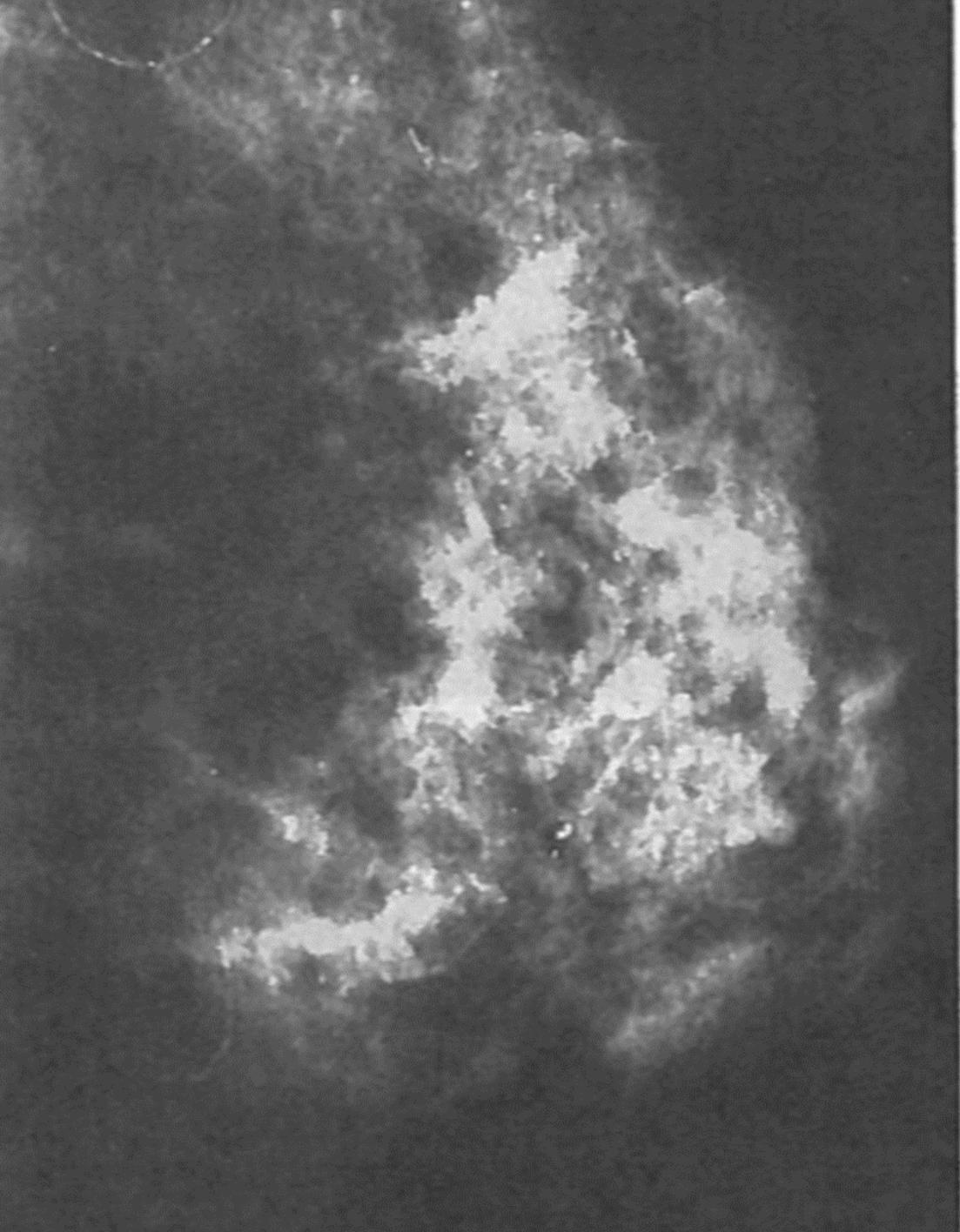
E. Azevedo, G. Svane, and B. Nordenstrom



- The patient was a 59-year-old woman with a epithelial breast tumor.
 - Two electrodes were used to supply a 10-15 mA current with an application of 10 Volts.
 - After one hour the current was increased to 70 mA.
- The treatment lasted two hours.

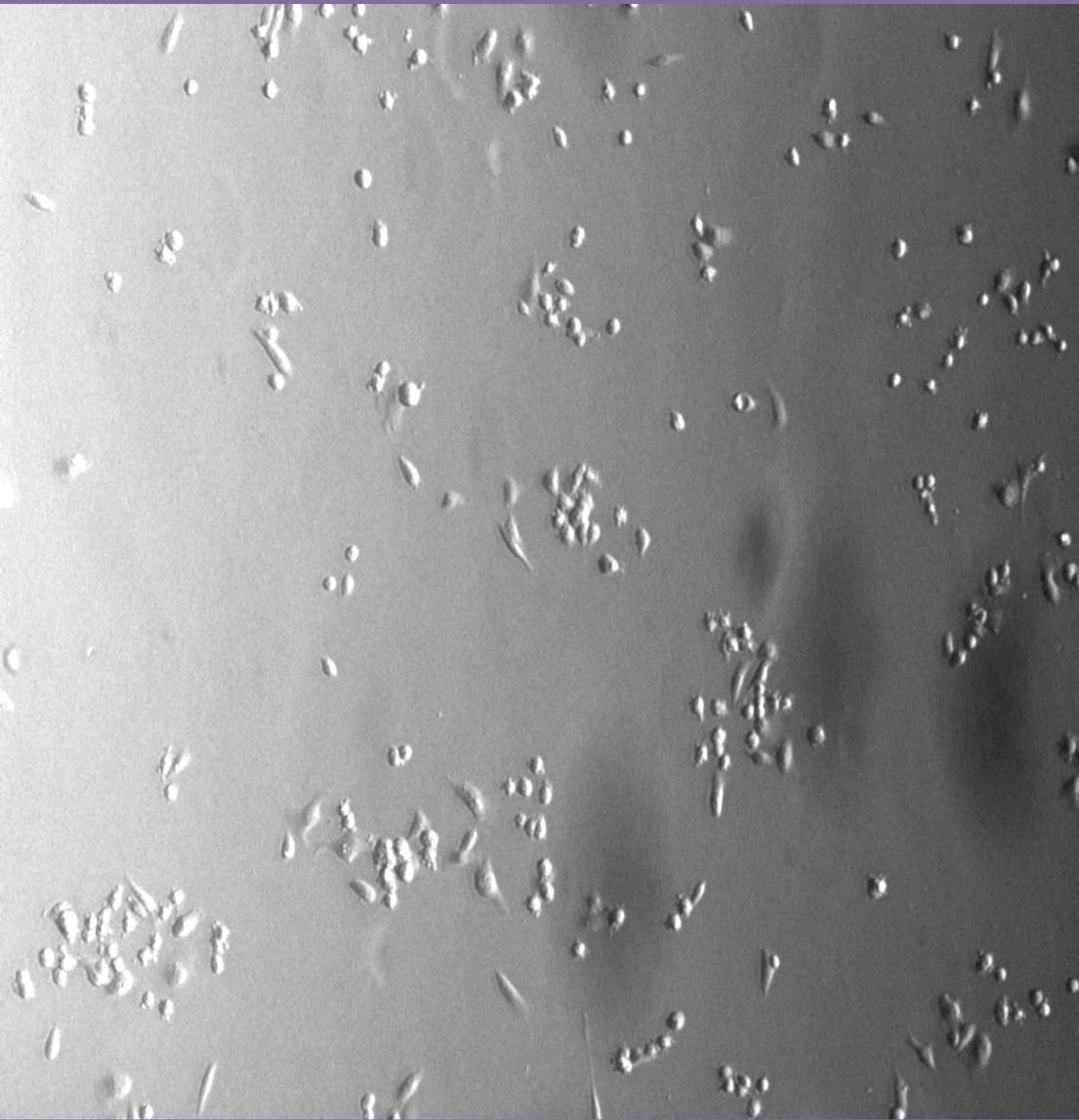


- Two days after treatment, a mammogram showed reduction in the tumor size.
- A slight distortion in the surrounding tissue was observed.
- Follow up two years after treatment showed no indication of tumor regression.

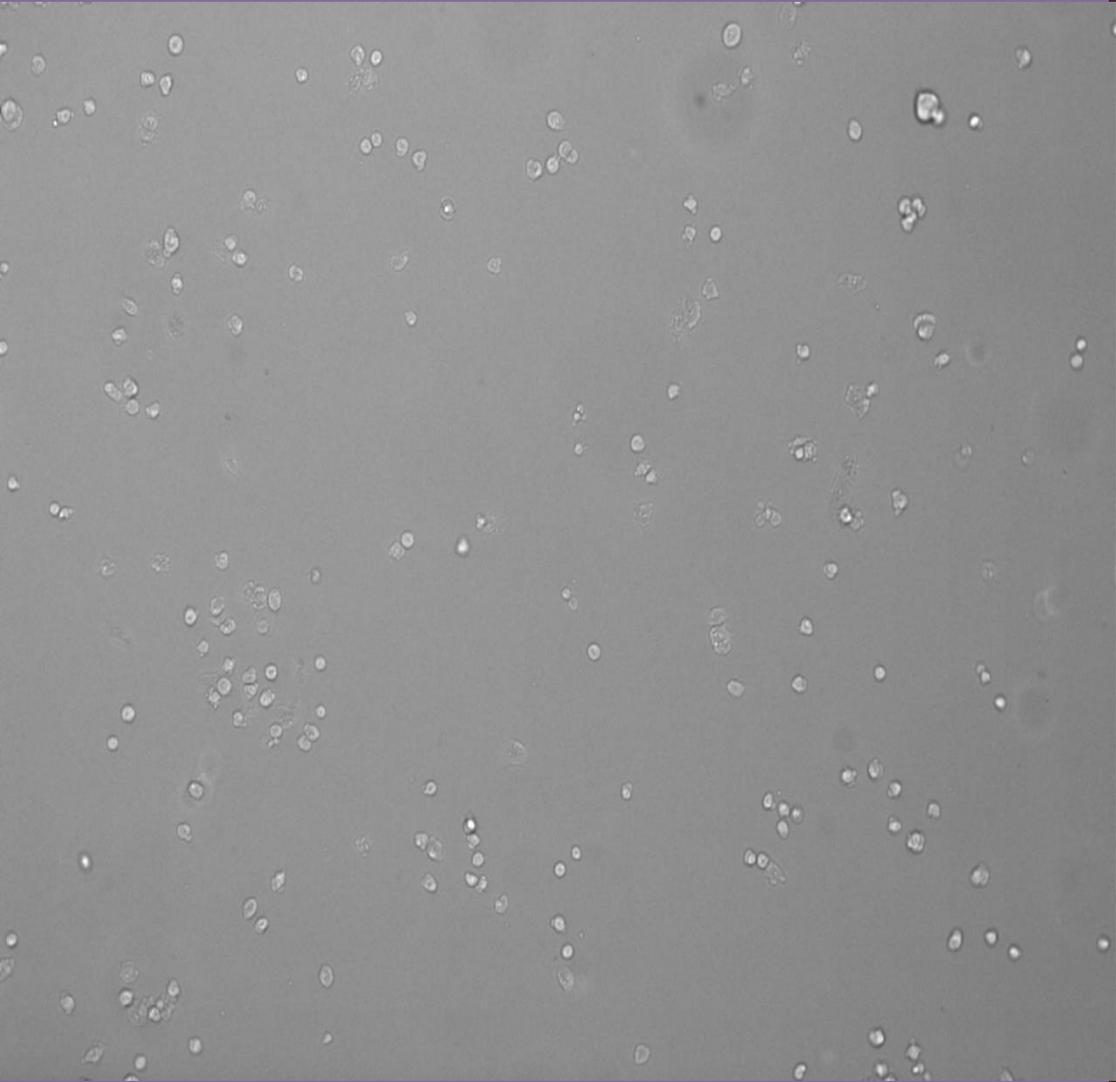


After one treatment.

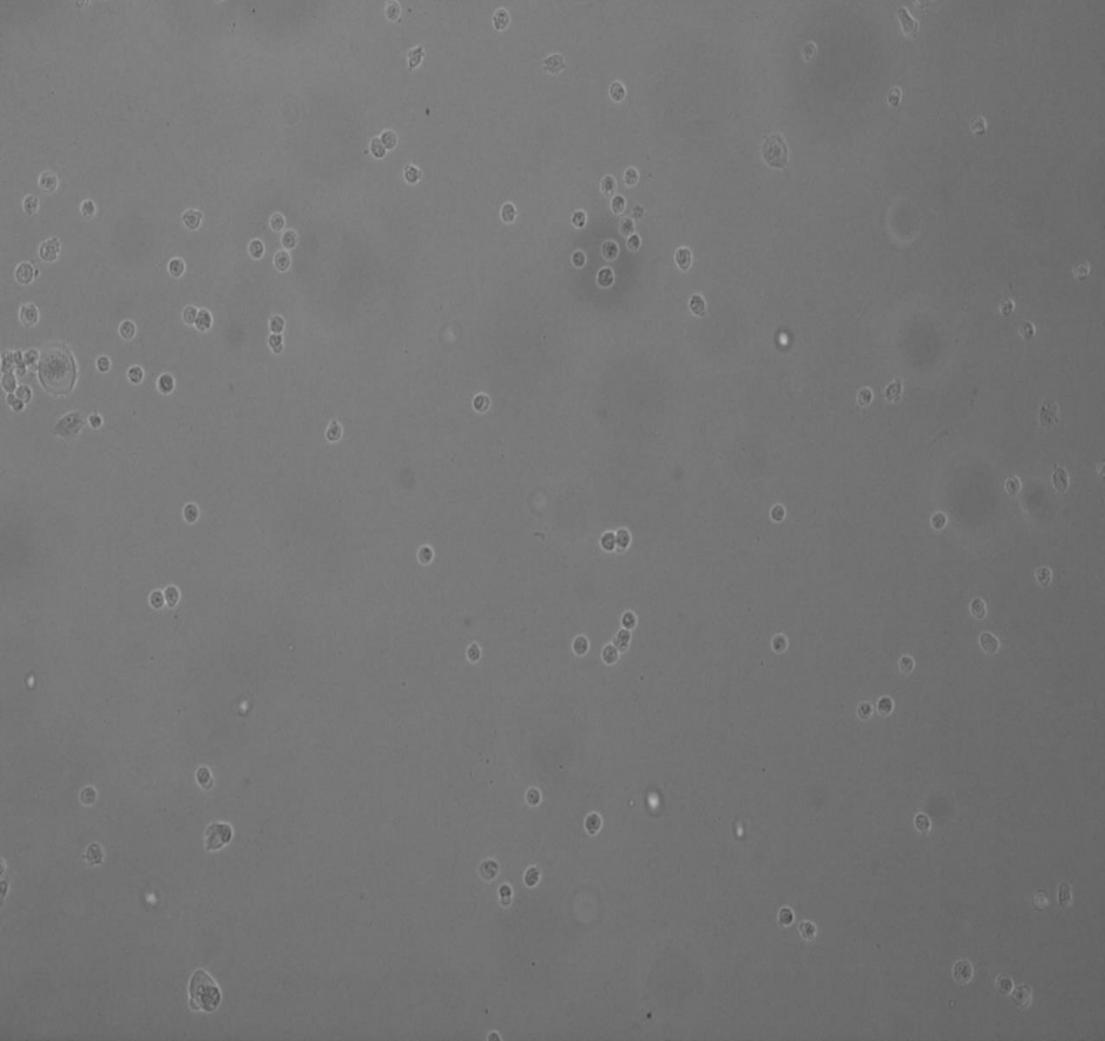
Electrolysis Treatment During Pregnancy.



- 231 breast cancer cell line.
- $A \approx 3$ volts to the plate for 8 minutes.
- Immediately after treatment.



- Four hours after treatment cells exhibit a round morphology.



- 10 hours after treatment.

Phase II

- Addition estrogen to cells.
- Varying treatment intervals and voltage.

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