

Abby Dorsky, Olivia Sottile, Ugur Topkiran, Diya Vashani, Himish Paul, Anton Naumov
 Department of Physics and Astronomy, Department of Biology, Texas Christian University

Abstract

Cell imaging is an important tool in cancer diagnosis and therapy. Folic acid receptors are overexpressed on the surface of various cancer cells, making it an attractive target for cancer imaging. In our research, we aim to exploit this biological phenomenon by creating Folic Acid Graphene Quantum Dots (FAGQDs) that can help us selectively target and visualize cancerous tissue. GQDs were used as a base due to their easy functionalization abilities, high cellular viability, and fluorescent properties that allow them to be tracked inside the cell. We functionalized GQDs with folic acid and assessed their structure and morphology as well as optical properties using FTIR, TEM, absorption, and fluorescence spectroscopies. In vitro toxicity tests have shown low toxicity (80% viability) of the synthesized FAGQDs. The proposed FAGQDs provide a novel platform for the detection of cancerous tissues and could be used as a cancer diagnosis biodevice.

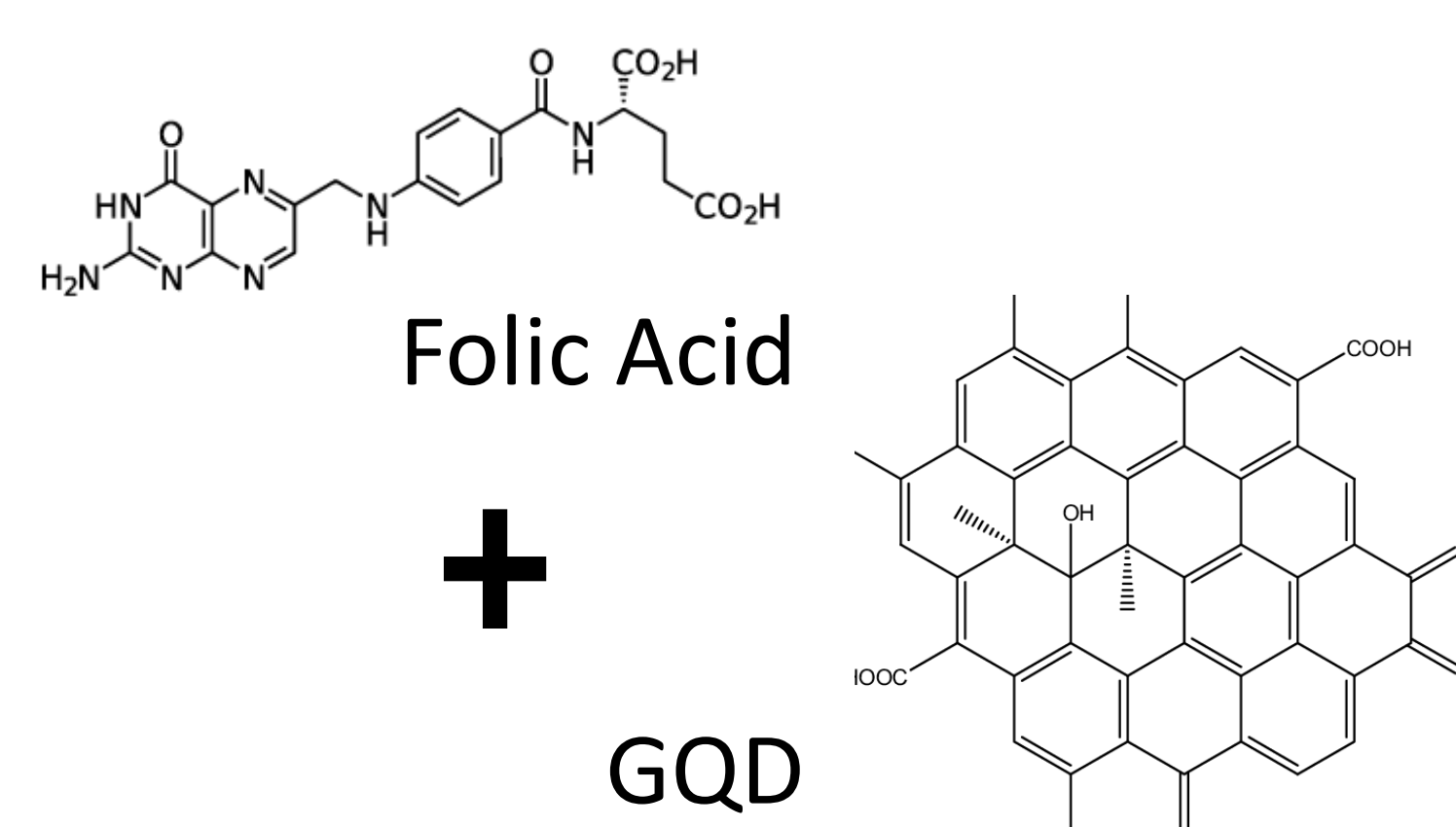
Background

GQDs

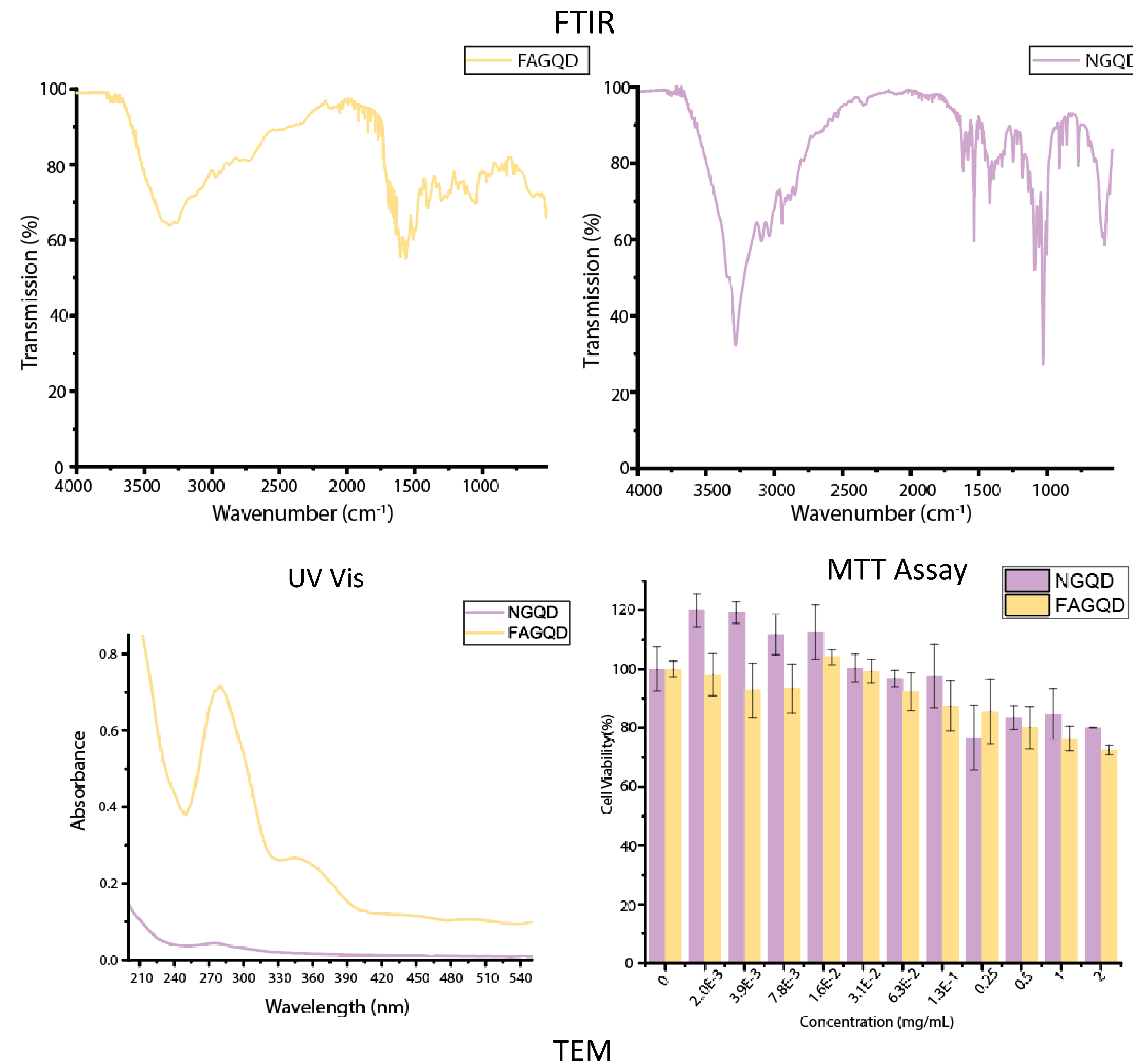
- Exhibit fluorescence and photostability
- Water soluble
- Can be used for:
 - Cancer therapeutics
 - Cell imaging

Folic Acid

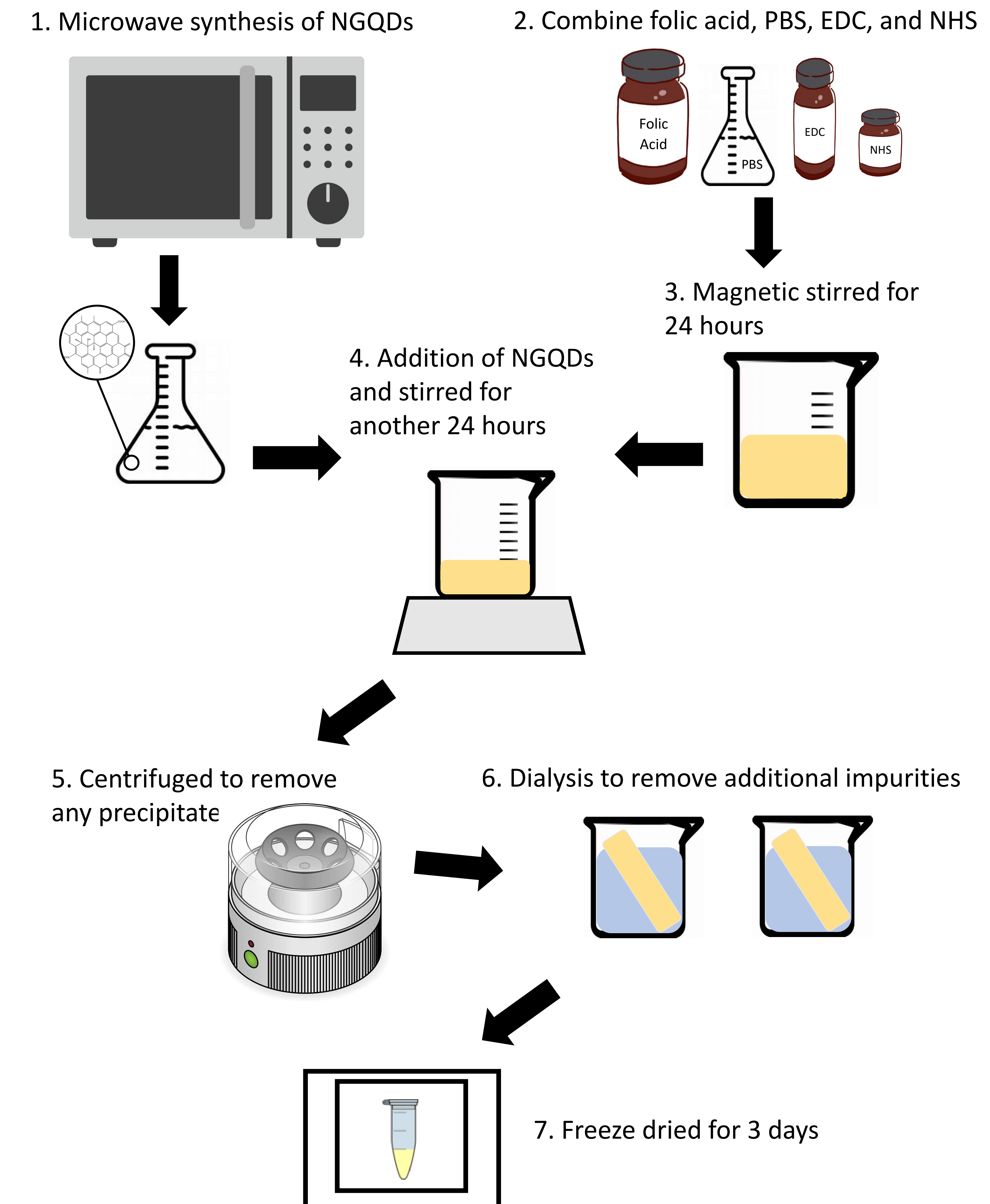
- Overexpressed in cancer cells
- Necessary for biosynthesis of nucleotides, amino acids, neurotransmitters



Results



Synthesis



Conclusions

- Able to synthesize Folic Acid doped GQDs
- MTT assay indicated cellular viability at a concentration of 1mg/mL
- TEM visualized the size of the GQDS
- As the project continues there will be uptake studies done in cancerous and noncancerous cell lines