

# Porphysome

## Executive Summary

Porphysome is a novel, patented nanovesicle formed from self-assembled porphyrin (an organic compound that is found in naturally-occurring compounds like hemoglobin and chlorophyll) and lipid with a diameter of 100 nm. Porphysomes have demonstrated significant potential in relation to diagnosis and the treatment of multiple tumors, as supported by more than 50 peer-reviewed publications.

## Team

Dr. Gang Zheng and his team at the University Health Network are internationally recognized as experts in porphyrin chemistry. They have created porphysome, an optically active porphyrin-lipid conjugate that behaves similarly to a liposome, an artificial vesicle that is used as a vehicle for drug delivery. Porphysome work has been supported by multiple national and international granting agencies.

## Target Market

Porphysome can be used as a multi-modal, multi-functional contrast agent for use in diagnosis and accurate localization of tumors. Porphysome can also be used in drug-delivery, photo-immunotherapy, and photodynamic and photothermal therapy of cancer.

## Clinical Need

Currently, tumor margins are typically gauged by the surgeon through visual assessment and palpation of the tumor intraoperatively. Porphysome has demonstrated capability for enhancing the accuracy of tumor margin detection. Enhancing the visualization of the tumor during surgical resection can dramatically impact both patients' health and related health economic benefits. Further, using porphysome as a light-activated therapeutic modality can potentially enhance the accuracy of cancer treatments.

## Product

Porphysome is a novel phototherapy agent, able to destroy diseased tissue by releasing heat due to its ability to absorb light in the near infrared region. Porphysomes can also be used as a drug delivery system—they can be directly labeled with radioisotopes to allow for real-time non-invasive imaging and tracking. Porphysomes are also fluorescent upon dissociation of the molecule and can be imaged optically to confirm the drug release. A physician can potentially inject drug-loaded porphysomes into a patient, confirm the arrival of the drug to the appropriate target, know exactly when the drug is released, and thus determine a drug's efficacy. All of this is done with a simple and elegant molecular structure that is completely biocompatible and non-toxic.

## Competition

There are many nanoparticle platforms based on synthetic polymers and/or metals with limited functionalities. Porphysome is a first-in-class nanoparticle component which has inherent imaging capabilities. Porphysome can be used as a diagnostic and therapeutic agent. It can further be used in targeted drug delivery.

## Intellectual Property

Patents issued in US, Japan, China, EU and Canada.

## Company Profile

### Industry:

Therapeutics and diagnostics

### Contact:

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### Engagement Opportunity:

Available for licensing or NewCo creation (Seeking seed capital: \$2-\$10M)

### Management:

Seeking a dedicated experienced executive entrepreneur to advance the commercialization of this technology.

### Scientific Founder:

[Dr. Gang Zheng](#)

### Partner:

University Health Network

### Publications:

- Nature Materials volume 10, pages 324–332 (2011),
- Adv Healthc Mater. 2014 Aug;3(8):1240-9
- J Biomed Opt. 2016 Aug 1;21(8):84002
- Ann Thorac Surg. 2019 Jun;107(6):1613-1620

