# Oxygen Microbubbles Transiently Relieve Tumor Hypoxia And May Improve Radiation Therapy Tumor Control

**Session: *Radiobiology: Experiments and Modeling* 07/31/2018 1:45PM — 3:45PM**

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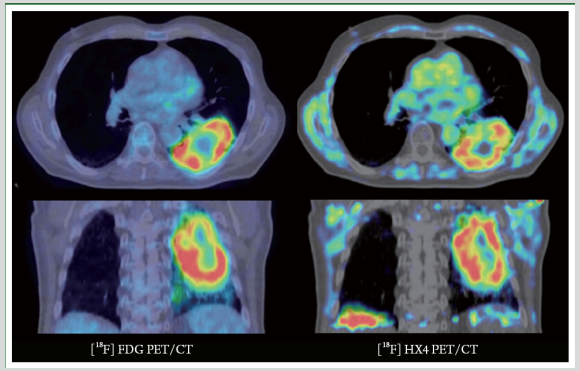
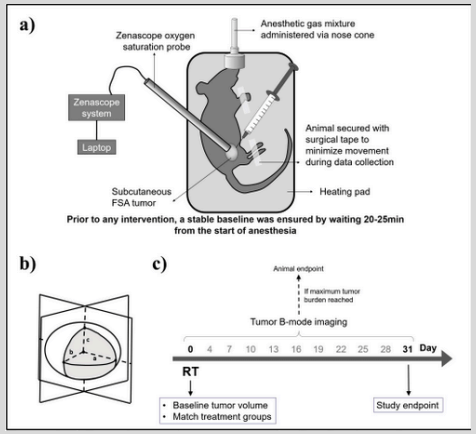
## THE PROBLEM

**Tumor hypoxia hinders radiotherapy effectiveness**




- Hypoxic cells needs 3 times more radiation to die compared to well-oxygenated cells
- Current methods to reoxygenate tumor cells are ineffective and can be toxic

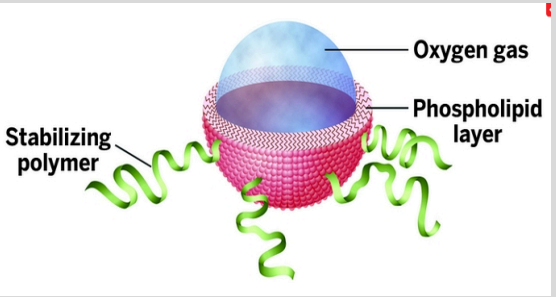
## THE EXPERIMENT




- Female Fisher 344 rat with rat fibrosarcoma tumor implanted on a flank
- A single dose of 15Gy (6MV) delivered to the tumor at a size of 2-3mm (c)
- OMB or NMB (Nitrogen microbubbles, as a control) injected intra-tumorally right before before radiation beam-on
- Tumor volume measured by ultrasound imaging post irradiation (b)
- Tumor oxygen level measured (a)

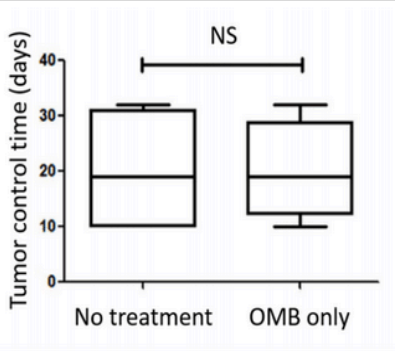
## THE HYPOTHESIS

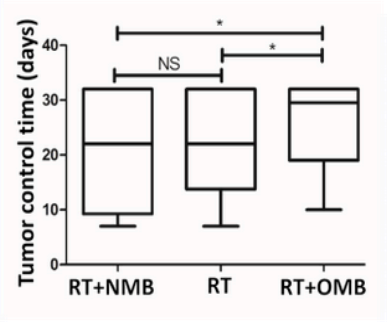
**Oxygen microbubbles (OMB) injection may be a practical and safe method to re-oxygenate tumor for radiotherapy**

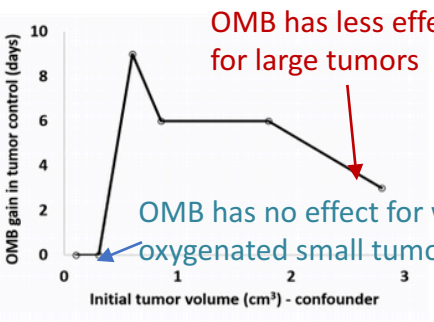



- lipid-stabilized oxygen microbubbles (OMB) are FDA approved
- OMB Injection can be performed right before radiation delivery

## KEY RESULTS




- Oxygenation level in tumor peaked 97 sec. after injection on average
- The OMB induced-increase in tumor oxygenation lasted for over 18 min. on average