Oxygen delivery to tissues might be a good way to overcome low oxygenation level in many pathologies, such as cancer, wound healing or cardiovascular diseases. In cancer, low oxygen level is connected to worse response to therapies, especially to radiotherapy.
Our goal will be to test if oxygen nanobubbles will be effective in increasing oxygenation of tumors in mice. Oxygen will be released from nanobubbles in tumor by an ultrasound impulse. Its spreading through the tissue will be observed noninvasively by electron resonance imaging. In order to achieve this, we will construct a high-sensitivity detector to enhance our imager, and perform the initial tests in solutions. In the next steps we will check out the oxygen spreading from nanobubbles in animal tumors. If this way of oxygen delivery proves to be successful, in the last step we will check if radiotherapy with nanobubbles is indeed more effective than without them. The implications of this study might be important in many other low oxygenation related diseases.