



Department  
Radiation

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## Hyperthermia

Hyperthermia is a form of therapy where heat is used to enhance effectiveness of radiation and chemotherapy and to destroy tumors. Recent randomized clinical trials have clearly demonstrated the benefit of adding hyperthermia to radiation therapy and/or chemotherapy for the treatment of recurrent breast cancer, melanoma, head and neck cancer, prostate, cervix, and other sites of locally advanced or recurrent cancers. Hyperthermia is especially useful for re-treatment of previously radiated sites. Our faculty and staff are experienced and internationally recognized experts in the field of hyperthermia and radiation therapy.



Our comprehensive clinical service has state-of-the-art ultrasound, microwave, and electromagnetic/RF (radio frequency) technologies that allow us to selectively tailor the hyperthermia treatment to patient-specific requirements. Our external ultrasound and microwave applicators are used to heat superficial tumors up to approximately 8 centimeters deep. Interstitial and endocavity microwave applicators can be used for deep-body sites treated with high dose rate (HDR) brachytherapy [1]. Our electromagnetic deep heating system can treat sites deep within the body.



A special device called a surface applicator is applied over the region of the tumor.

Hyperthermia is most often used to treat tumors that are close to the surface of the body. A special device called a surface applicator is applied over the region of the tumor. The tumor area is heated to a temperature of 40-43°C (104-109°F) for approximately one hour. Hyperthermia treatments are given within one hour of radiation therapy or chemotherapy. Hyperthermia can also be used to treat deeper tumors using interstitial sources when combined with high dose rate (HDR) brachytherapy or a deep-heating system. In addition to the standard of care hyperthermia, we are also supporting the following clinical trials:

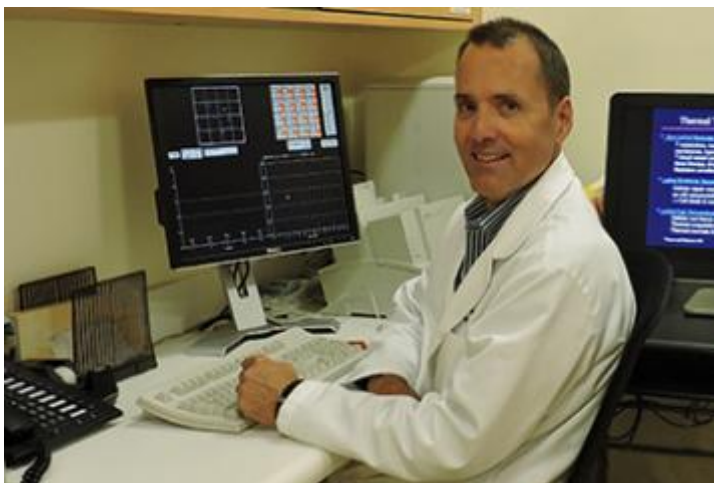
? Hyperthermia with Thermodox [2]

? Catheter Based Ultrasound Hyperthermia [3]

? Deep Regional Hyperthermia [4]

## Conditions Treated

- Recurrent breast cancer
- Locally advanced breast tumors
- Melanoma
- Locally advanced cancers of the uterus, cervix and prostate
- Neck tumors
- Advanced, persistent tumors
- Large, bulky tumors



**Chris Diederich, PhD [5] Director, Hyperthermia Physics**

## Highlights

- Active hyperthermia program since 1986
- Multi-modality, state-of the art equipment
- Ultrasound, microwave, and electromagnetic/radio frequency treatment procedures

- Interstitial devices for conformal hyperthermia with HDR brachytherapy
- Nursing staff with experience in re-radiation and hyperthermia
- The first North American Phase III trial to demonstrate survival benefit of hyperthermia and radiation was performed at UCSF for treatment of brain tumors
- Dedicated staff for comprehensive quality assurance and consistent treatment
- Only National Cancer Institute Comprehensive Cancer Center with multimodality hyperthermia in the western United States.

## Hyperthermia Equipment and Technology

- Labthermics Sonotherm 1000, BSD-500, and BSD-2000



- Multiple element ultrasound arrays for intensity-modulated conformal hyperthermia
- Single aperture and multiple element microwave array applicators
- Controlled hyperthermia of superficial tumors up to 8 cm depth
- Interstitial microwave antennas for combining hyperthermia with HDR brachytherapy
- Electromagnetic system for deep heating within the pelvis or abdomen
- Catheter-based ultrasound technology for 3D conformal hyperthermia with high dose rate (HDR) brachytherapy
- Ultrasound imaging for on-site tumor depth and probe measurements
- Hyperthermia Treatment Planning

Our hyperthermia team tailors treatment to meet the needs of each individual patient. We welcome phone and email inquiries and requests for additional information.

**Hyperthermia Team**

Joe Hsu, MD [6], Director of Clinical Hyperthermia

Chris Diederich, PhD [5], Director, Hyperthermia<sup>\*</sup>/Physics

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**Source URL:** <https://radonc.ucsf.edu/hyperthermia>

**Links**

[1] <https://radonc.ucsf.edu/brachytherapy-hdr-ldr>

[2] <https://clinicaltrials.gov/show/NCT00826085>

[3] <https://clinicaltrials.gov/ct2/show/NCT00911079>

[4] <http://cancer.ucsf.edu/clinical-trials/cervical-cancer>

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