

What Does Infrared Imaging Reveal?

Angiogenesis and Thermography

Solid tumors have three basic components:

1. Cancer cells >60%
2. Blood vessels (angiogenesis) >5%
3. Interstitium >30%

Although angiogenesis occurs in a variety of conditions, it is **central** to malignant behavior, including growth, local invasion and metastases and occurs in the earliest development stage.

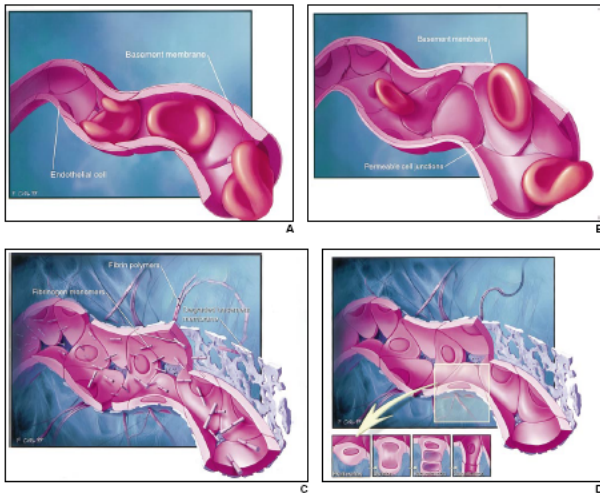


Fig. 2—Illustrations depict basic steps involved in tumor angiogenesis.
 A. Normal capillary has intact endothelium.
 B. Host capillaries dilate and develop increased permeability.
 C. Tumor cells from biological microenvironment, creating extracellular matrix that facilitates cell growth. Proteases and collagenases break down capillary basement membranes.
 D. Endothelial cells proliferate across disrupted basement membrane and create new functional vessels.

Thermography has been repeatedly proven to accurately detect tumor angiogenesis. At the most basic level, early, rapid tumor enhancement is directly related to angiogenesis.

Angiogenesis is stimulated by the tumor cells directly through the release of cytokines and growth factors, which in turn stimulates tumor growth.

These new vessels are formed by the sprouting of capillaries from already existing microvessels as seen above. The resulting tumor vessels are abnormal and disorganized in both structure and function.

The Infrared Body

This biological/metabolic activity creates subtle heat, stimulating local sympathetic fibers that innervate at the dermis. This opens the tiny microfibrils at the surface of the skin, revealing the body's normal internal infrared source, creating an exact pattern of the inflammation and/or angiogenesis below the skin surface. *This phenomenon can only be recorded with a precision medical infrared imaging*

References

- Tumor Transport Physiology:** Implications for Imaging and Imaging Guided Therapy. Brian S. Kuszyk, Frank M. Cort, F. Nicholas Franando, David A. Bluemke
- Cancer Growth:** Implications for Medicine and Malpractice. Michael Retsky, PhD.

Redefining Early

Below is a "Simple formulation that within reasonable accuracy describes the size of a primary breast tumor as a function of time." Michael Retsky, PhD.

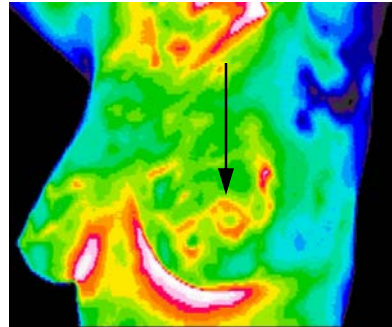


We can estimate the usual pre-clinical time of breast cancer as 30 doublings at a 90-100 day doubling time, or approximately eight years. Clinical detection currently occurs at most only the last 25% of the growth history of a tumor. Michael Retsky, PhD.

Early Vessel Formation

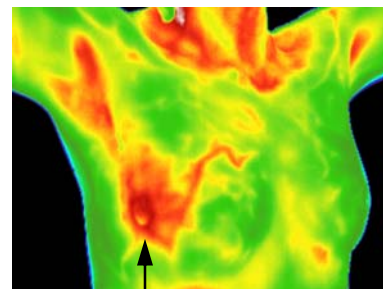
A small, early developing tumor tends to have a uniform blood vessel distribution.

The advancing periphery of the tumor tends to be hypervascular (therefore hyperthermic) whereas the tumor center is hypovascular (therefore hypothermic) and often necrotic.



Advanced Stage

As the tumor grows larger, a more heterogeneous distribution of vascular supply develops in different regions of the tumor. In Thermography we observe a more diffuse pattern surrounding the tumor itself, as seen below.



Notice: Thermography is not a standalone device and does not replace mammography or any other anatomical testing device