

## INFLAMMATION

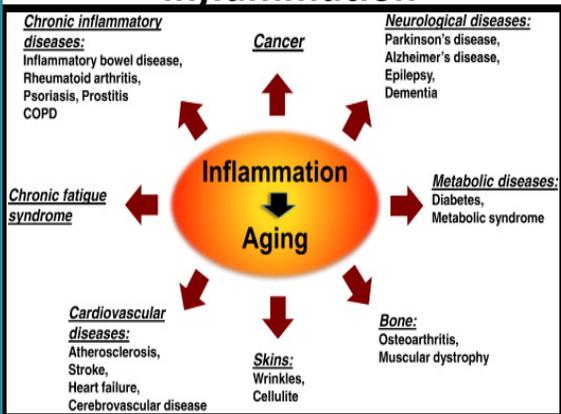
Inflammation is a red flag to a variety of diseases, illnesses and ailments that plague people from all walks of life. Inflammation in and of itself is the response that a healthy body has to cellular damage or a threat to the body. This means that when our bodies are struggling with inflammation, it's a warning sign of something else. Inflammation isn't the cause of illnesses or disease, but rather, it is our body's way of telling us that something is wrong, or trying to fight back against what is harming it.

Chronic inflammation "occurs when your immune system gets set permanently to "on." As a result, it constantly releases a flood of damaging chemicals that could sicken your cells. It's like a forest fire that never goes out," says naturopathic physician and nutritionist Kellyann Petrucci, ND.

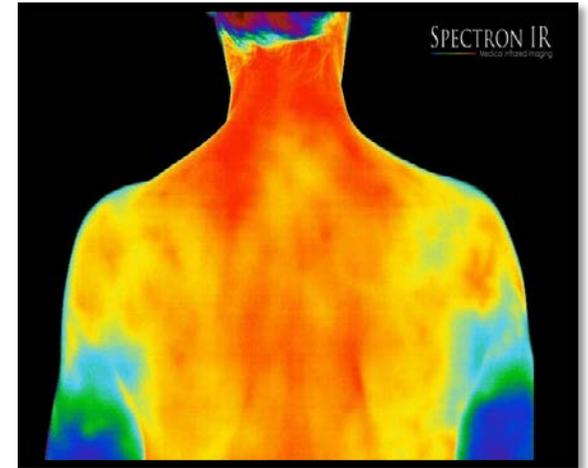
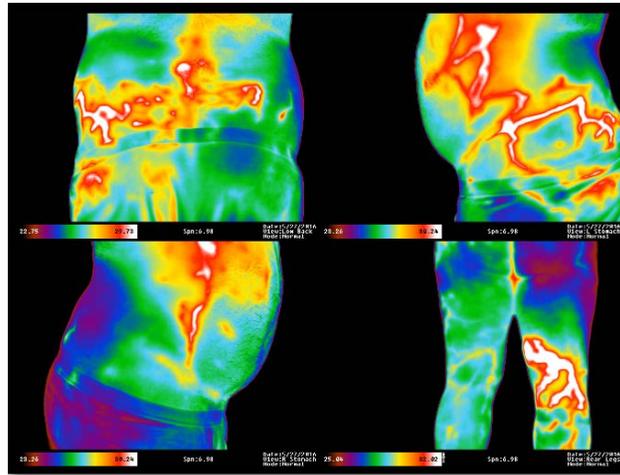
## CHRONIC INFLAMMATION

In chronic inflammation, the inflammatory process may begin even if there is no injury, and it does not end when it should. Why the inflammation continues is not always known. Chronic inflammation may be caused by infections that don't go away, abnormal immune reactions to normal tissues, or conditions such as obesity. Over time, chronic inflammation can cause DNA damage and lead to cancer. 2

### Diseases with chronic inflammation



- 1.) Lee-Ellen Copstead, Jacquelyn Banasik, *Pathophysiology*, Third Edition,
- 2.) National Cancer Institute, NIH
- 3.) Mrinal Kanti Bhowmik , et.al. Department of Computer Science and Engineering, Tripura University, *Pain Related Inflammation Analysis using Infrared Image*.
- 4.) Rainer H. Straub1, and Carsten Schradin, *An evolutionary trade-off between acutely beneficial but chronically harmful programs*



## INFLAMMATION



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A SMART Approach to Inflammatory Detection

## WHAT IS INFLAMMATION?

Inflammation occurs when cells are injured, regardless of the cause of the injury. It is a protective mechanism that can be caused by many conditions. Any injury to tissue will evoke an inflammatory response including surgery, trauma, burns, toxins, bacteria and other causes. Inflammation may be acute or chronic. 1

## INFLAMMATORY RESPONSE

The inflammatory response is remarkably the same, regardless of the cause. Events in the inflammatory response process include increased vascular permeability, recruitment of white cells, and elimination of antigens and debris.

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### WHAT DOES THERMOGRAPHY HAVE TO OFFER?

Currently there is no definitive test for inflammation — the best that conventional medicine can do is measure blood levels of [C-reactive protein](#) (a pro-inflammatory marker) and the irritating amino acid called homocysteine

Temperature difference in the skin surface reflects the abnormality present in the human body. Considering the phenomenon, detection and forecasting the change of temperature is the principal objective of using Medical Infrared Thermography (MIT) as a diagnostic tool for inflammatory pain diseases.

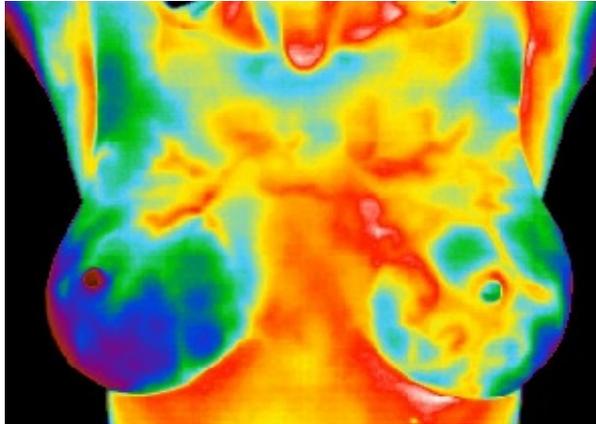
Thermography offers a non-invasive, non-contact, radiation-free imaging modality to assess abnormal inflammation. The thermogram creates a map of the skin surface temperature which can indicate an inflammatory process is or will occur, demonstrated through heat patterns. Abnormal heat patterns provide an indicator that something may be happening in the body that could require more investigation.

### WHAT CAN HAPPEN IF INFLAMMATION GOES ON UNCHECKED?

Although inflammation has been studied for decades, there's still a lot left to learn about this complex physiological condition. It's basically an unnecessary state of hyperactivity in the body, in which the immune system's reserve capacity is thrown into overdrive. This excess immune activation sends the wrong cellular signals to various parts of the body — and can wind up worsening conditions like diabetes, Alzheimer's, and potentially even cancer.

"The connection between inflammation and cancer has moved to center stage in the research arena," notes Robert A. Weinberg of the Massachusetts Institute of Technology's Whitehead Institute for Biomedical Research.

Cancer could, in essence, become a chronic disease akin to rheumatoid arthritis, another inflammatory condition. "Keep in mind almost no one dies of primary cancer," says Raymond DuBois, provost of the University of Texas M. D. Anderson Cancer Center and a researcher of anti-inflammatory agents for cancer. "A patient almost always dies from a metastasis."



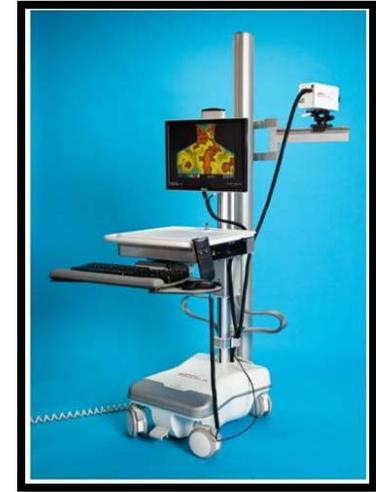
"Inflammation wastes your energies and wastes your [immune system] reserves, which are usually needed and required and restricted for acute situations like injury and infection," said Dr. Irini Sereti, chief of the HIV pathogenesis division at the National Institute of Allergy and Infectious Diseases.

### Chronic inflammation may cause DNA damage to the cells

Inflammatory diseases such as Crohn's disease and multiple sclerosis have been linked to faults in a critical immune pathway that enables inflammation to continue unchecked.

## Abnormal heat patterns may indicate inflammation in the body

It has been recognized that during chronic inflammatory systemic diseases (CIDs) maladaptations of the immune, nervous, endocrine and reproductive system occur. Maladaptation leads to disease sequelae in CIDs. The ultimate reason of disease sequelae in CIDs remained unclear because clinicians do not consider bodily energy trade-offs and evolutionary medicine.



The evolution of physiological supersystems, fitness consequences of genes involved in CIDs during different life-history stages, environmental factors of CIDs, energy trade-offs during inflammatory episodes and the non-specificity of CIDs are all deciding factors. Incorporating bodily energy regulation into evolutionary medicine builds a framework to better understand pathophysiology of CIDs by considering that genes and networks used are positively selected if they serve acute, highly energy-consuming inflammation.