



RADIONUCLIDE DETECTION OF INFLAMMATORY LESIONS

Inflammatory response – local

- increased blood flow
- increased permeability of blood vessels
- cellular response – migration of leukocytes
- activation of endogenous inflammatory mediators:
 - vasoactive amines (histamine)
 - plasma factors (prostaglandins, leukotrienes, tromboxane)

Rubor

Dolor

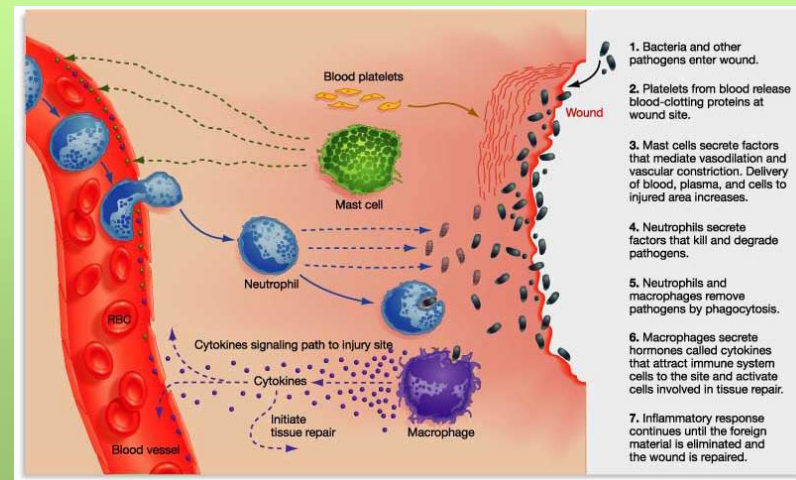
Calor

Tumor

(Cornelius Celsus I w.n.e.)

Functio Laesa

(Galen 130-200 r.)



Inflammatory response - constitutional

1. General fatigue
2. Fever
3. Leukocytosis, ESR/CRP elevation



Radiopharmaceuticals

1. Polyclonal immunoglobulins (IgG) labelled with ^{99m}Tc or ^{111}In
2. Leukocytes labelled with ^{99m}Tc or ^{111}In (in vitro, in vivo)
3. ^{67}Ga -citrate

Mechanism of accumulation

1. Immunoglobulines labelled with ^{99m}Tc (lub ^{111}In): passive transport from blood vessels to the inflammatory lesions, and adherence to bacterial cell wall.
2. Leukocytes labelled with ^{99m}Tc (lub ^{111}In): migration to inflammatory lesions (chemotaxis).
3. ^{67}Ga -citrate: passive transport from blood vessels to the region of inflammation with help of transport proteins (transferrin and lactoferrin).

Detection of inflammatory lesions with different imaging techniques

- Morphological imaging methods are usually insufficient in diagnostics of early phase of inflammation.
- Difficulties in differentiating between active inflammation and anatomical abnormalities caused by a surgical procedure, injury etc.
- No possibility of whole body imaging

Clinical applications

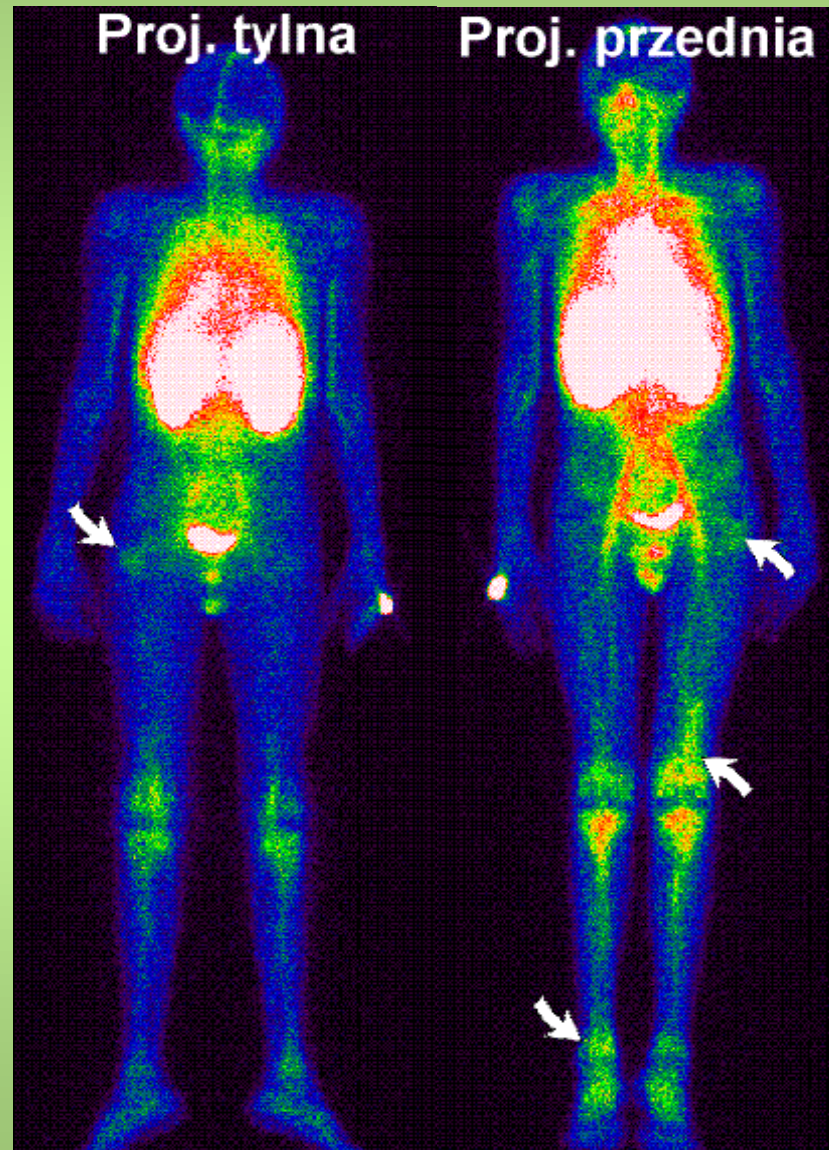
1. Diagnosis of inflammatory complications after orthopedical interventions (mainly arthroplasty)
2. Diagnosis of multifocal osteomyelitis (especially in children)
3. Evaluation of the activity of inflammatory process of intestines
4. Fever of unknown origin

Inflammation around the hip prosthesis

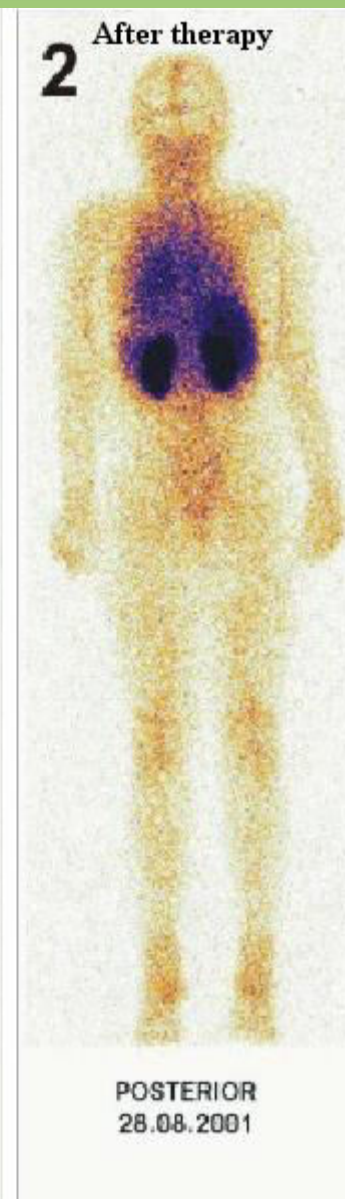


^{99m}Tc -IgG

Osteomyelitis spread via bloodstream

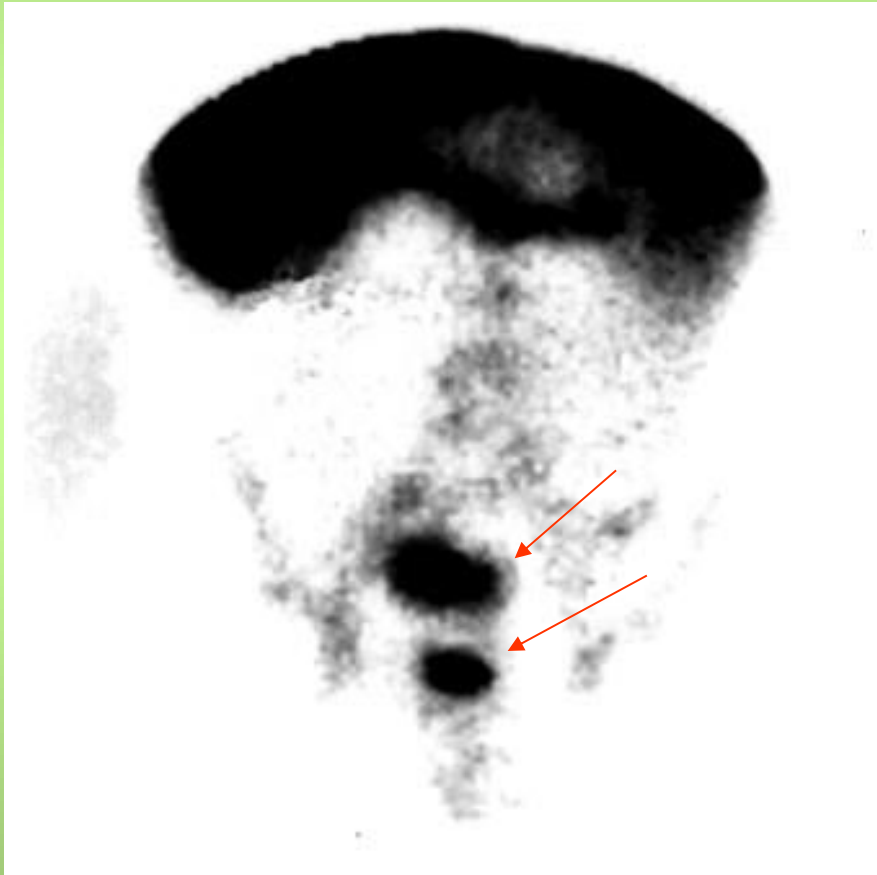


Inflammation of the calcaneus



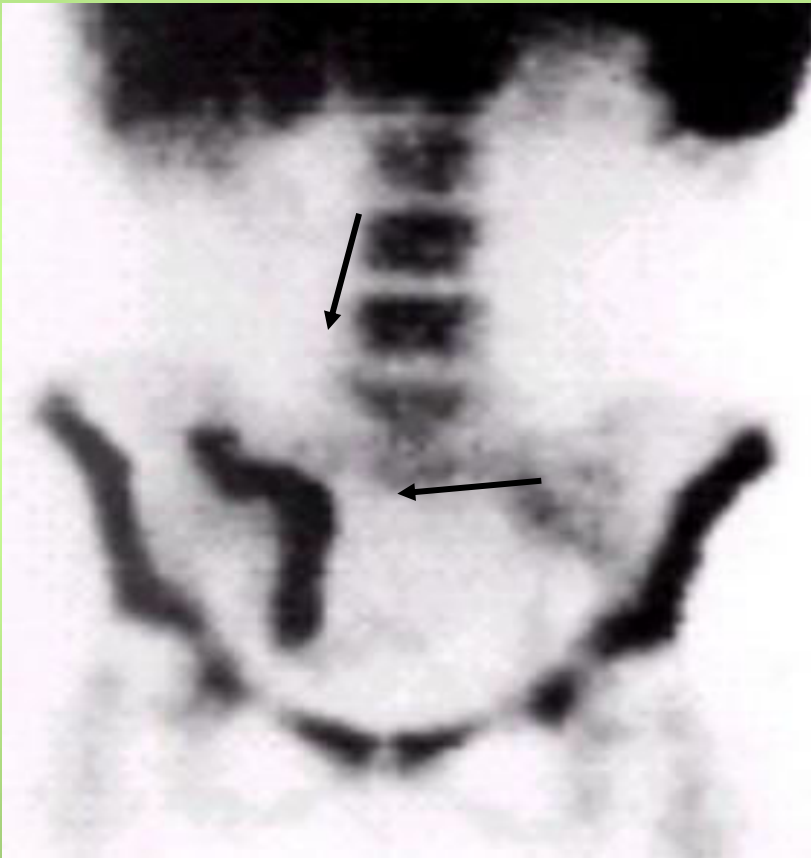
Control study after therapy

Post-surgical peritoneal abscesses



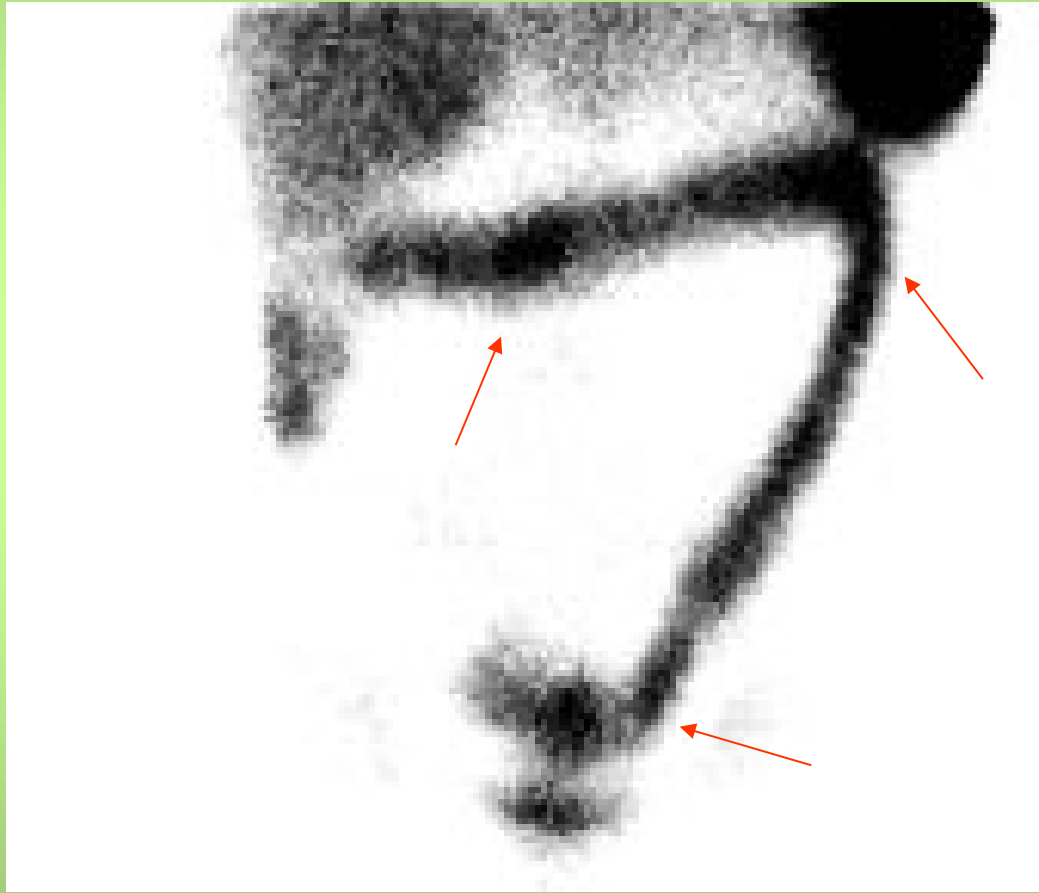
^{111}In -leukocytes

Crohn disease



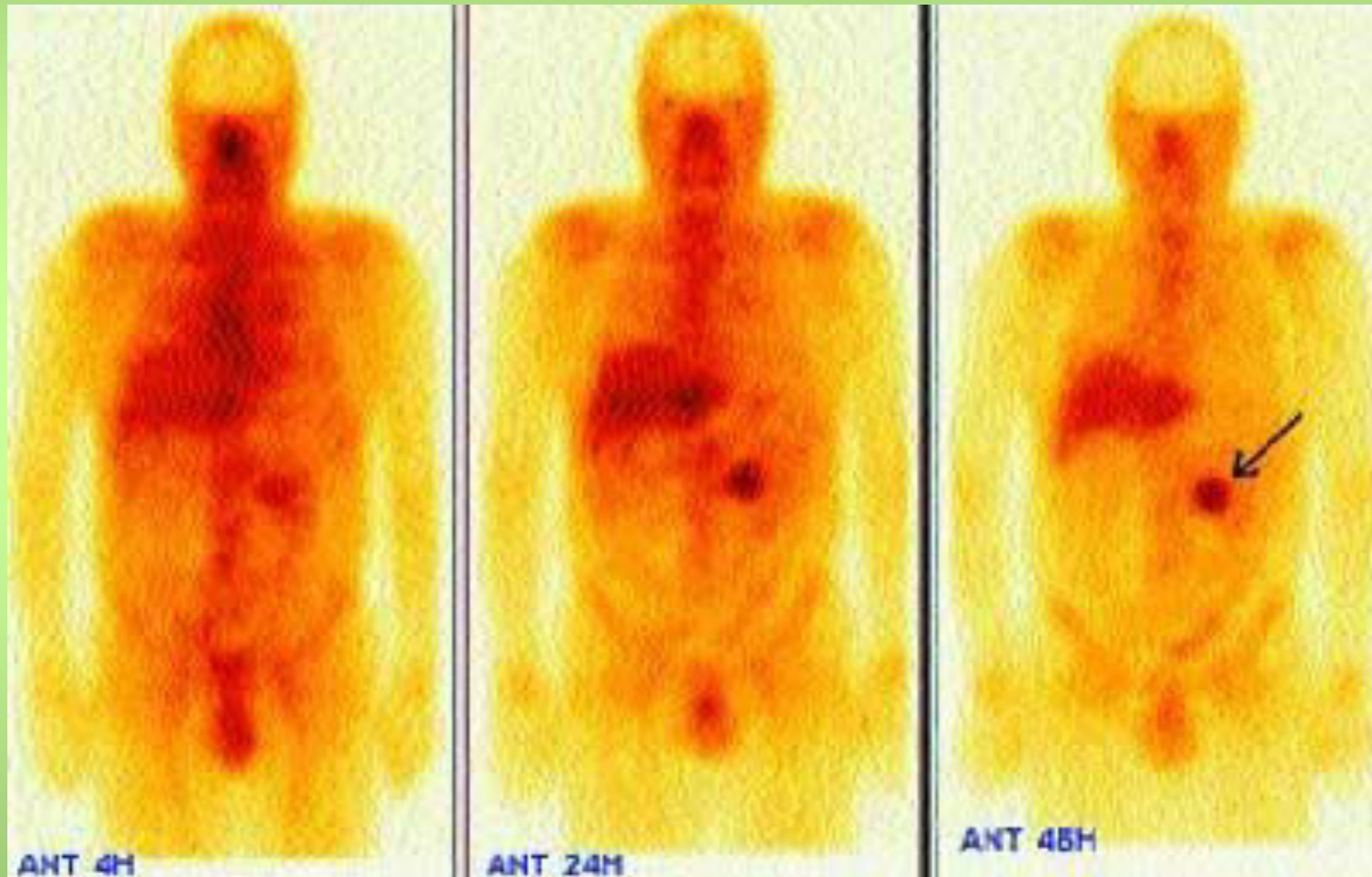
^{111}In -leukocytes

Colitis ulcerosa



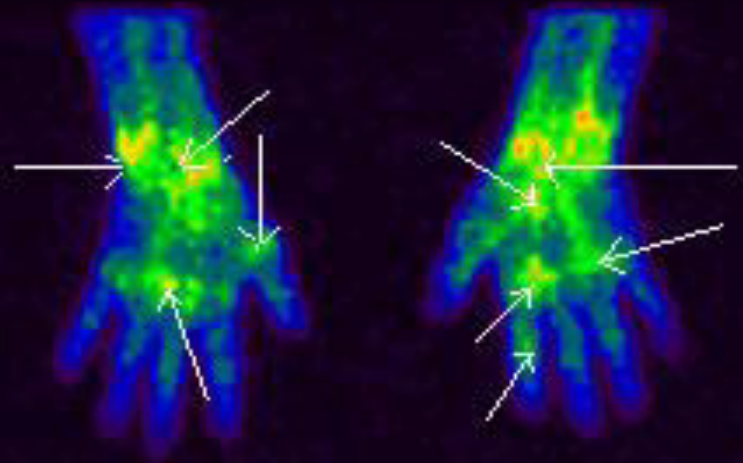
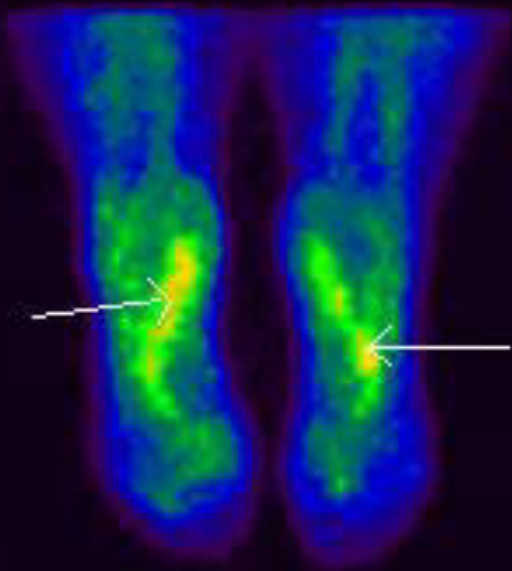
^{111}In -leukocytes

Fever of unknown origin - peritoneal abscess



^{67}Ga -citrate

Rheumatoid polyarthrititis



^{99m}Tc -IgG