

Application Note

Unraveling Molecular Mechanism of Pathological Conditions of Metabolic Syndrome by in vivo Molecular Imaging



In recent years, obese adipose tissue is attracting attention as an “active metabolic organ” that causes various diseases. Especially, visceral obesity and inflammation play a central role in metabolic syndrome. It was found that visceral obesity caused remodeling of adipose tissues based on chronic inflammation, and insulin resistance was occurred, which eventually leads to development of arteriosclerosis lesion, and cause new blood vessel events.

To elucidate the molecular mechanisms of pathological conditions consisted by the complicated and multi-cellular abnormal interactions in remodeling tissues, an “in vivo molecular imaging” based on the CSU system was developed.

By using this technique, it becomes possible to precisely evaluate the three-dimensional changes in the structures in living tissue, and the multi-cellular dynamics in vivo with high time and spatial resolutions.

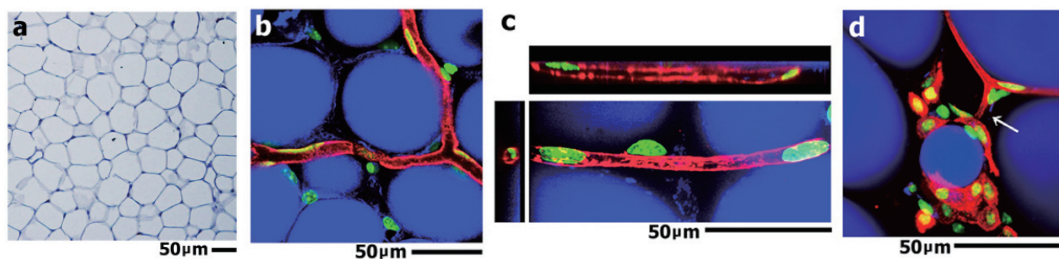


Figure 1: Images of the remodeling of adipose tissue in live animals

- a : Conventional adipose tissue specimen (lean, db/+ mouse)
- b & c : Images of a white adipose tissue of an 8-week-old thin mouse (lean, db/+)
- d : Adipose tissue of an 8-week-old obese animal (obese, db/db)

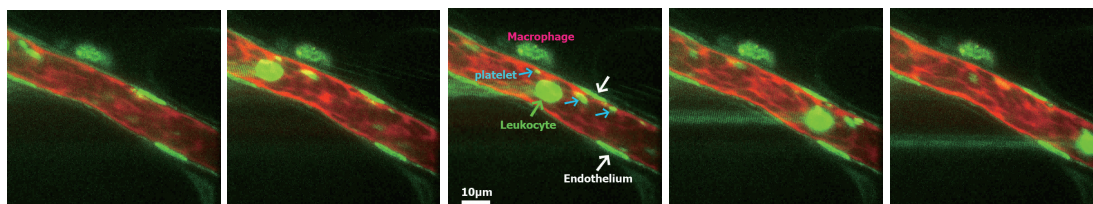


Figure 2: An example of real-time multi-color movie of microcirculation in mouse, which clearly shows dynamic movement and interactions among leucocytes, platelets, macrophages and endothelium.

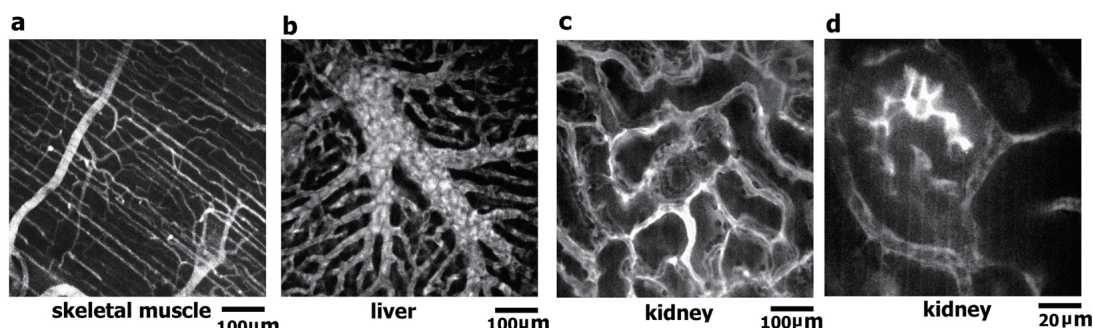


Figure 3: Application of “in vivo molecular imaging” on various organs
(Blood flow images of a: Skeletal muscle, b: Liver, c & d: Kidney glomeruli)