

# In vivo molecular imaging technique reveals parenchymal and interstitial cell cross-talks in chronic inflammatory disease

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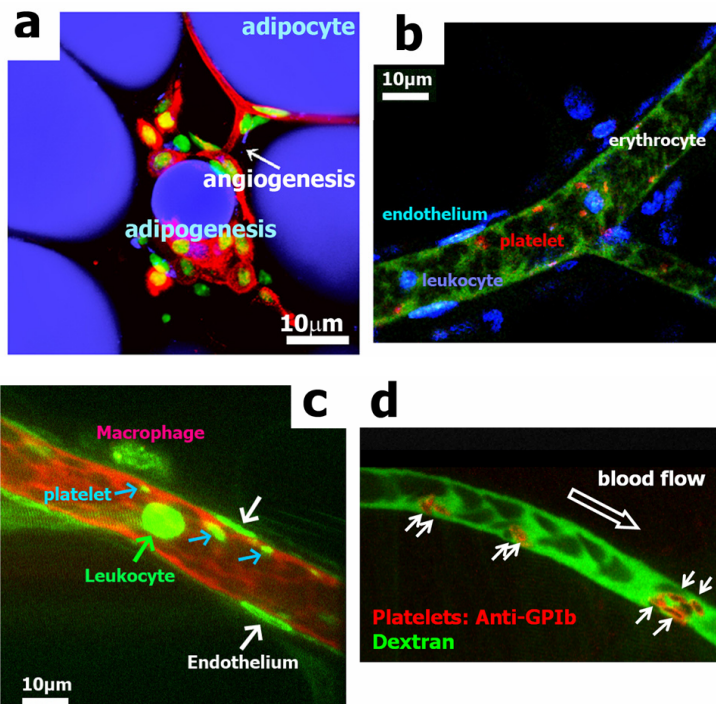
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Metabolic syndrome is a major risk factor of cardiovascular events, and adipose tissue obesity based on chronic inflammation play a central role. Adipose tissue contains multiple cell types including stromal cells: adipocytes, macrophages, lymphocytes, and endothelial cells, and their interaction is important in obese adipose tissue remodeling including angiogenesis, and adipogenesis [1]. However, little is known about the detailed mechanisms of these cell-cell interactions, because much of the structural and functional integrity of the tissue is lost when it is fixed, processed and sectioned. A direct *in vivo* visualization technique, based on high-speed, single- and multi-photon laser confocal microscopy was therefore developed that made it possible to precisely evaluate the three-dimensional structures in living tissue, and the cell dynamics *in vivo* with a high time and spatial resolution [2] (a-c). Imaging revealed close spatial and temporal interrelationships between angiogenesis and adipogenesis in obese adipose [a]. In addition, increased leukocyte-platelet-endothelial cell interactions in the microcirculation of obese adipose were observed, a hallmark of inflammation [b,c]. We also found that large numbers of CD8<sup>+</sup> effector T cells infiltrated into obese adipose, and infiltration by CD8<sup>+</sup> T cells was essential for the initiation and development of adipose inflammation [3].

This imaging technique also visualizes single platelet kinetics, and we revealed Lnk contribute to the stabilization of developing thrombus *in vivo* [4] (d). In addition, we established human iPS-derived platelets, and confirmed their function *in vivo*.

Our results clearly demonstrated the power of our imaging technique to analyze complex cellular interplays in inflammatory diseases, especially parenchymal and stromal cell cross talks, and to evaluate new therapeutic interventions against them.



## References

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