Outline of P&D Project

「Quantum and neuromodulation technologies to suppress tissue-specific disease-related microinflammation」

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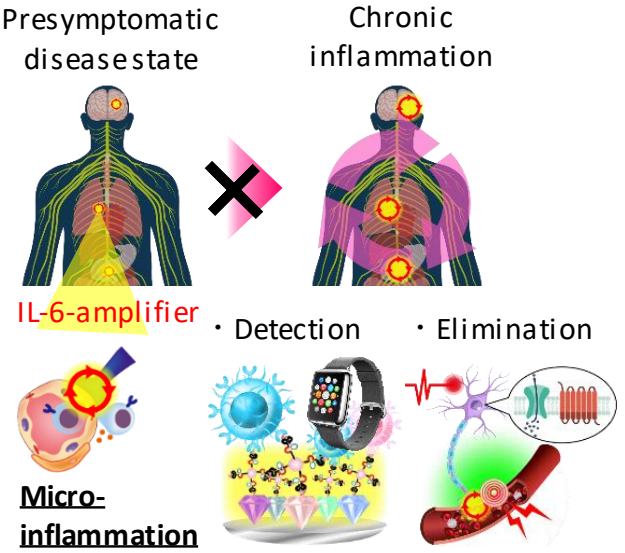
Outline of P&D Project

Tissue-specific disease-related microinflammation develops around blood vessels during presymptomatic disease. Currently, there is no method to detect and eliminate this microinflammation. In this proposal, we aim to establish two novel technologies to reset the presymptomatic disease state to the healthy state: quantum measurements and AI-based information integration analysis. First, we will detect a weak but minimal level of IL-6 amplifier* activation that leads to the development of tissue-specific microinflammation. Then, we will establish neuromodulation technologies** to eliminate the microinflammation via specific neural circuits including gateway reflexes.



*IL-6 amplifier: A mechanism in nonimmune cells to develop various diseases related to inflammation. It is stimulated by NFkB and STAT3 activation.
**Neuromodulation technologies: Weak electrical or magnetic stimulations on specific neural circuits that improve disease symptoms by eliminating microinflammation.

Expected Breakthroughs by 2040

- We will create two technologies to detect and eliminate microinflammation at the very early stage of chronic inflammation.
- ①Development of ultra-high sensitivity microinflammation diagnostic technology based on multidimensional analysis of self-reactive T cells, autoantibodies, and tissue-specific IL-6 amplifier activation using nanodiamond quantum sensors and the nanopore method.
- ②Development of technology to suppress microinflammation by using novel neuromodulation methods on specific neural circuits, particularly those that induce gateway reflexes for autoreactive T cell accumulation in specific tissues.