

Acetone bio-sniffer (gas-phase biosensor) for monitoring of human volatile using enzymatic reaction of secondary alcohol dehydrogenase

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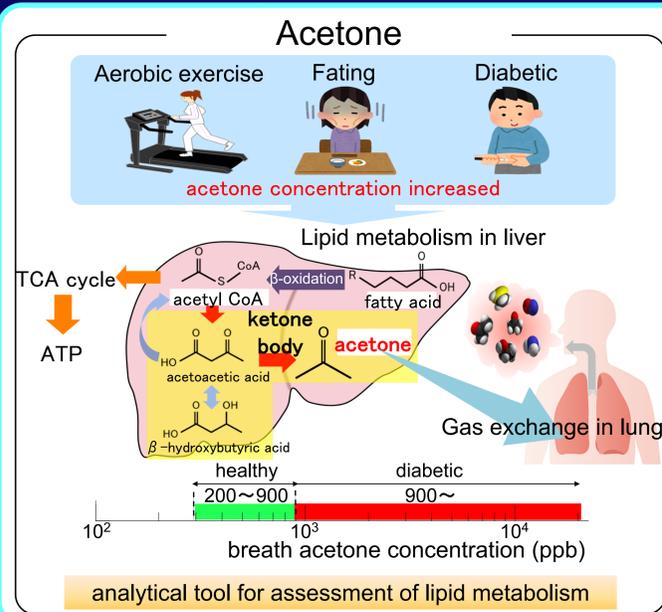
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OBJECTIVES

- Fabrication of fiber-optic biochemical gas sensor (bio-sniffer) for acetone vapor
- Application of the bio-sniffer to measure exhaled breath acetone concentration

Significance of acetone measurement

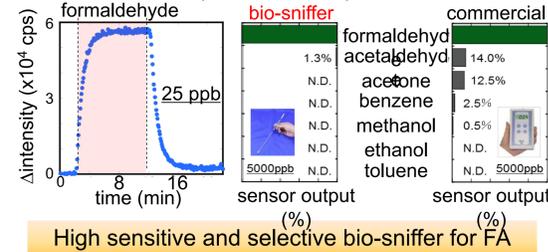


Conventional methods

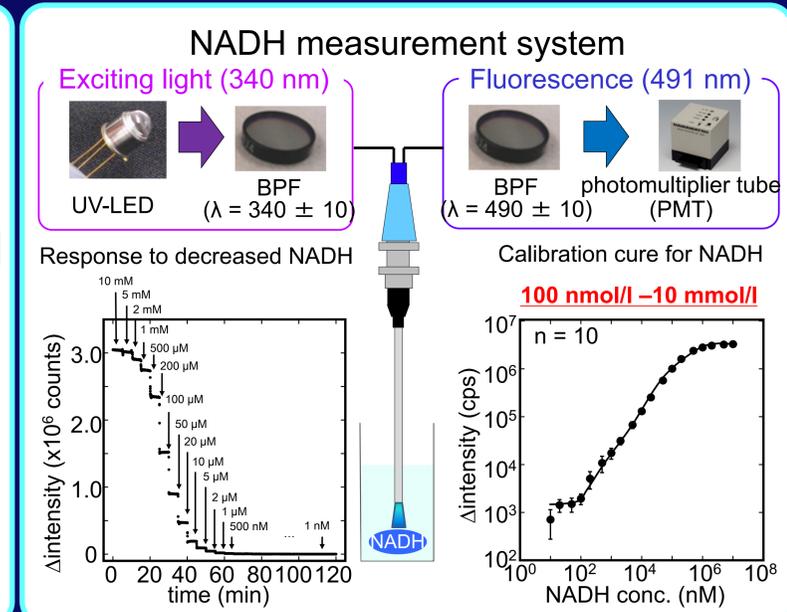
method	characteristics
GC-MS	○ sensitivity, selectivity × continuity
semiconductor	○ continuity, convenience × selectivity

simple continuous monitoring with good selectivity

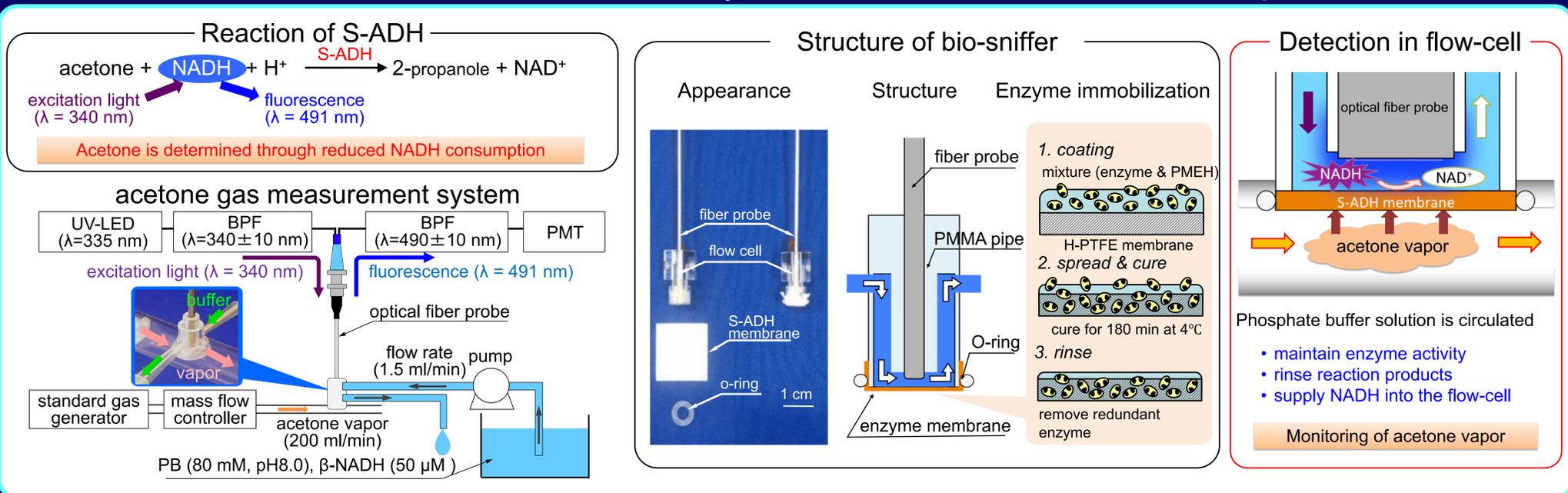
Biochemical gas sensor for formaldehyde (Bio-sniffer)



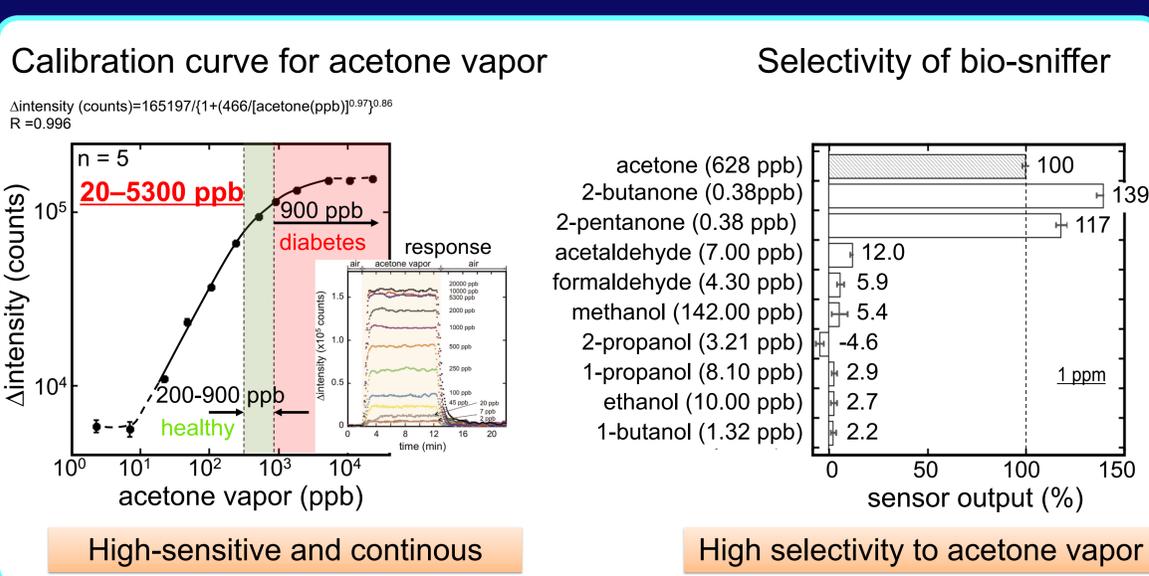
NADH sensor with photomultiplier



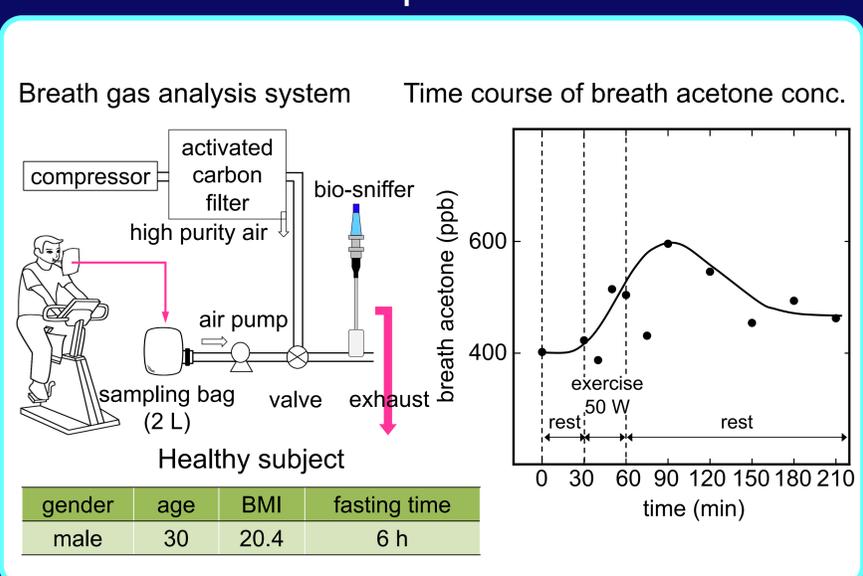
Fluorometric measurement system with flow-cell for acetone vapor



Characteristics of the acetone bio-sniffer



Assessment of lipid metabolism



SUMMARY

- The high-sensitive and high-selective acetone bio-sniffer with flow-cell was constructed
calibration range : 20–5300 ppb response time (95%): 35-70 s C.V. (500 ppb): 2.62%
- The bio-sniffer was successfully applied to assessment of lipid metabolism