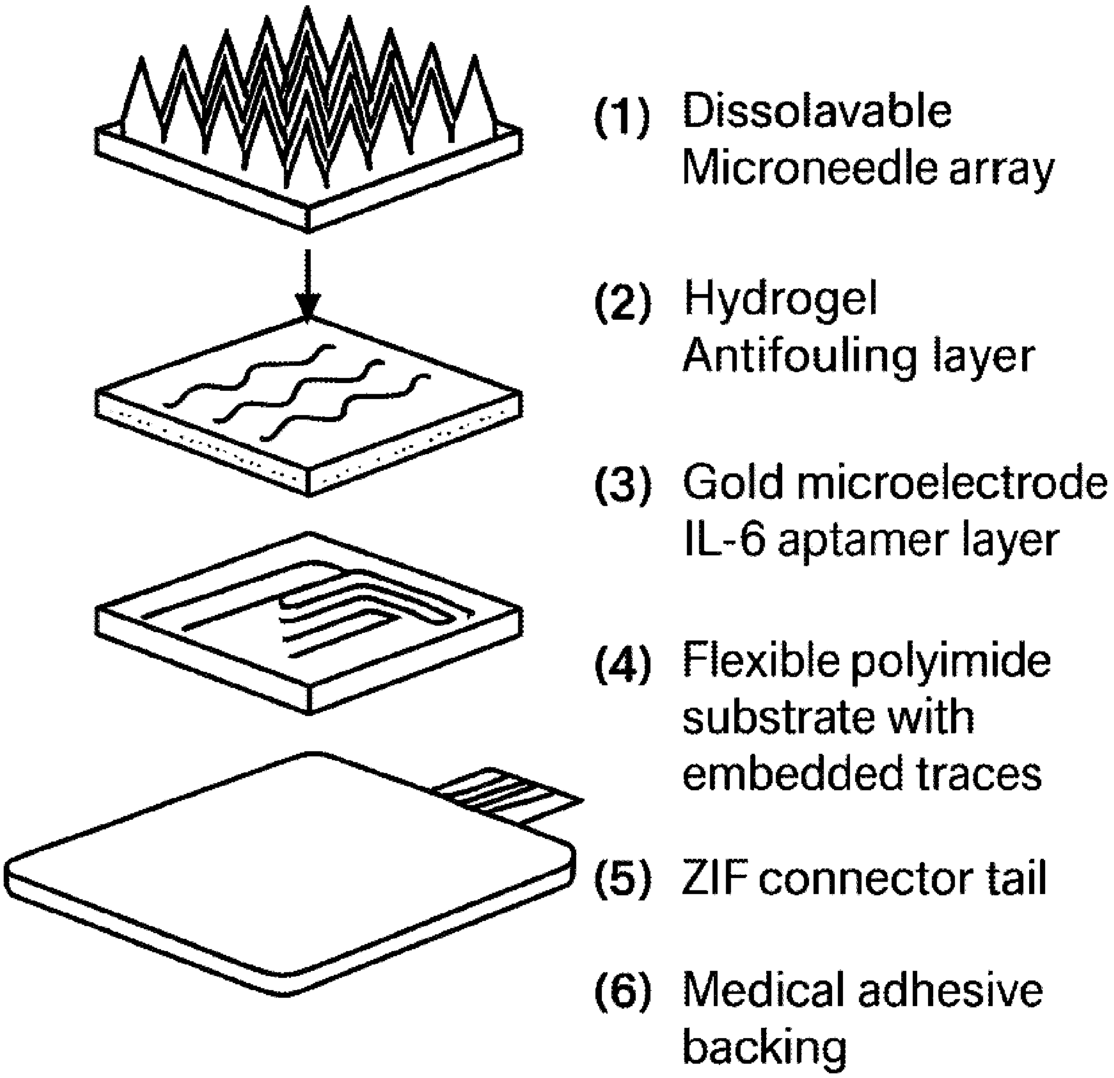
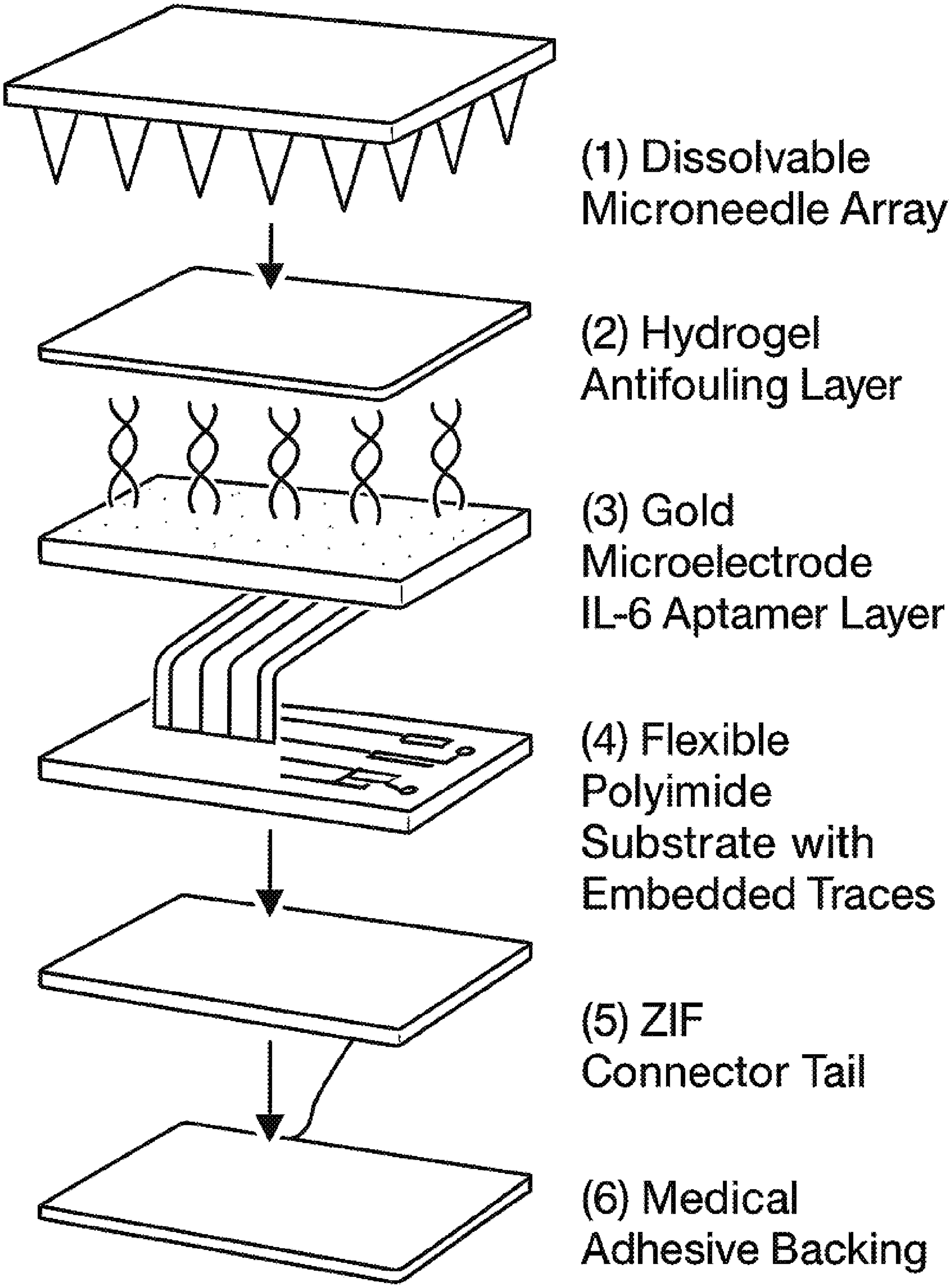
# Figures

Fig 1:




(1) Dissolvable Microneedle Array
(2) Hydrogel Antifouling Layer
(3) Gold Microelectrode IL-6 Aptamer Layer
(4) Flexible Polyimide Substrate with Embedded Traces
(5) ZIF Connector Tail
(6) Medical Adhesive Backing

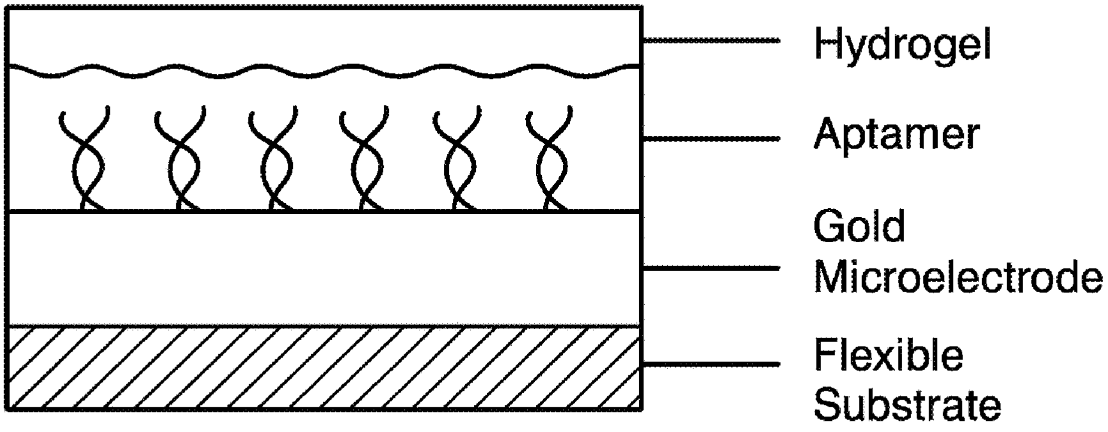
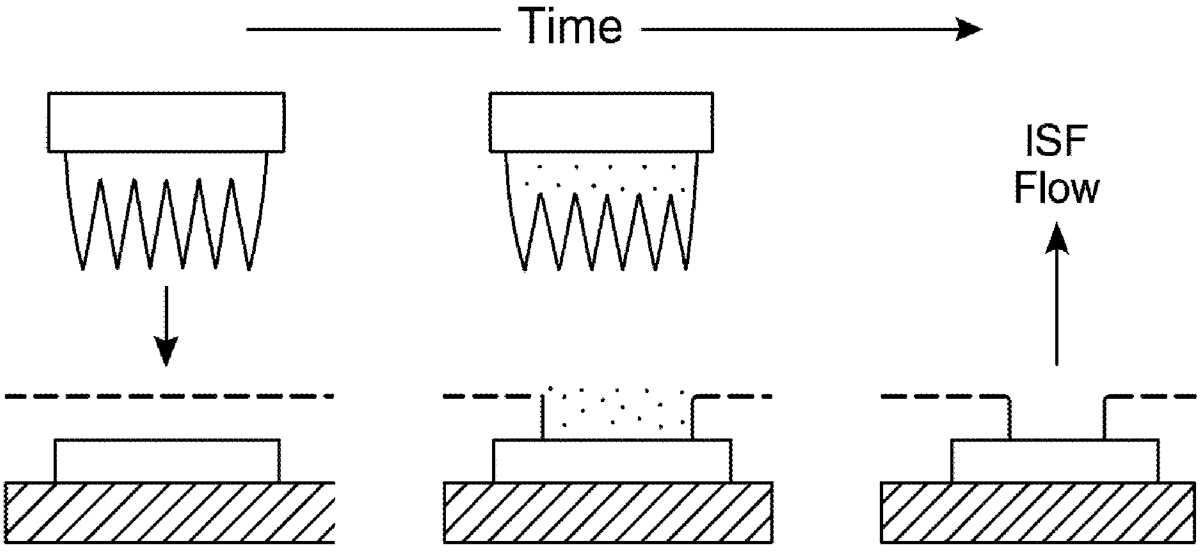


FIG. 5-2



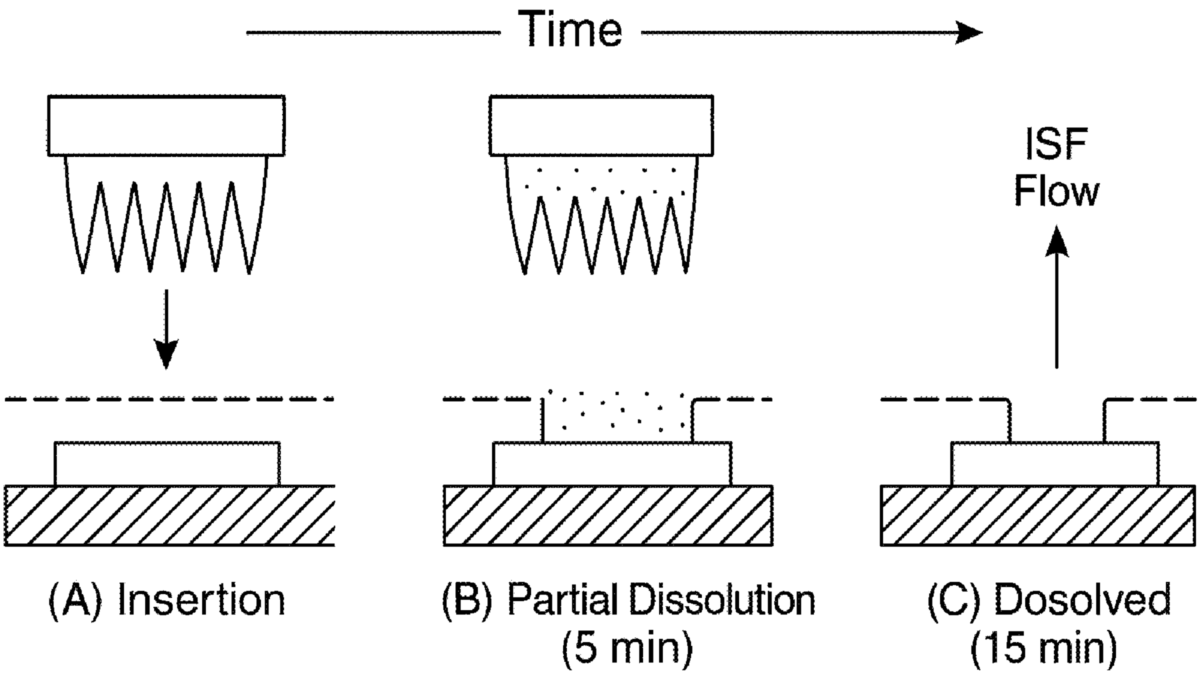
(A) Insertion

(B) Partial Dissolution (5 min)

(C) Dosolved (15 min)

Layered imserction–disslosution time-course

Fig 3



Layered imserction–disslosution time-course

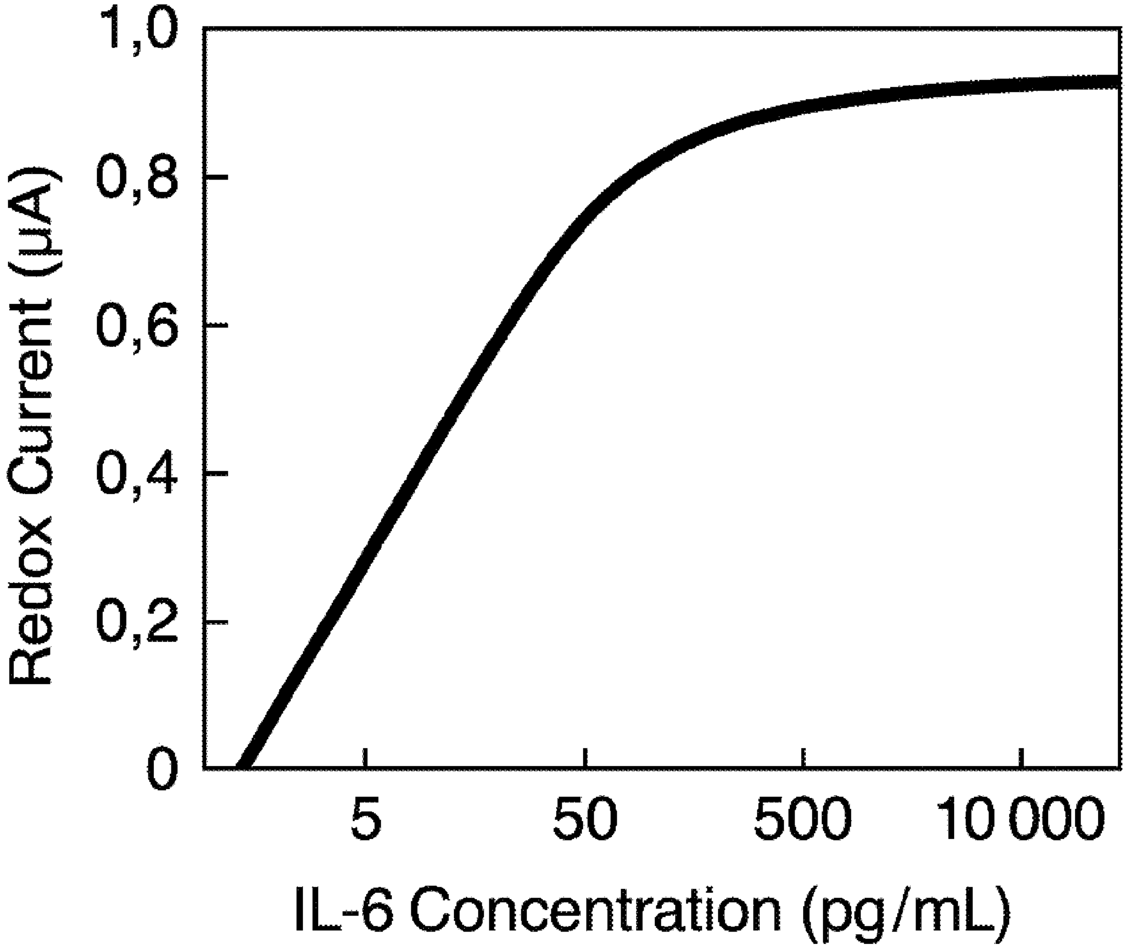

1,0
0,8
0,6
0,4
0,2
0
Redox Current (µA)
5
50
500
10 000
IL-6 Concentration (pg/mL)

Fig. 5–4

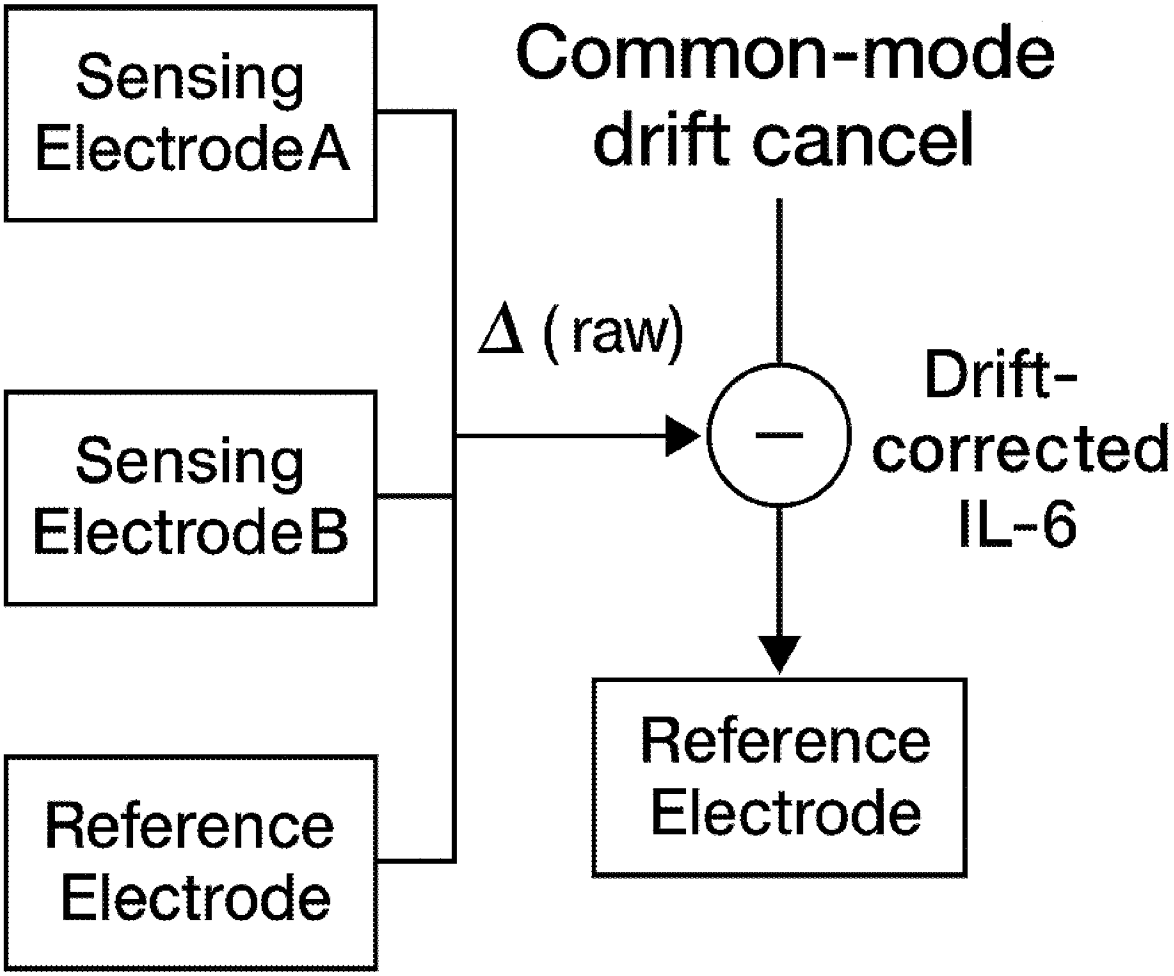


**FIG. 5–5**

Dual-channel redundancy & drift–

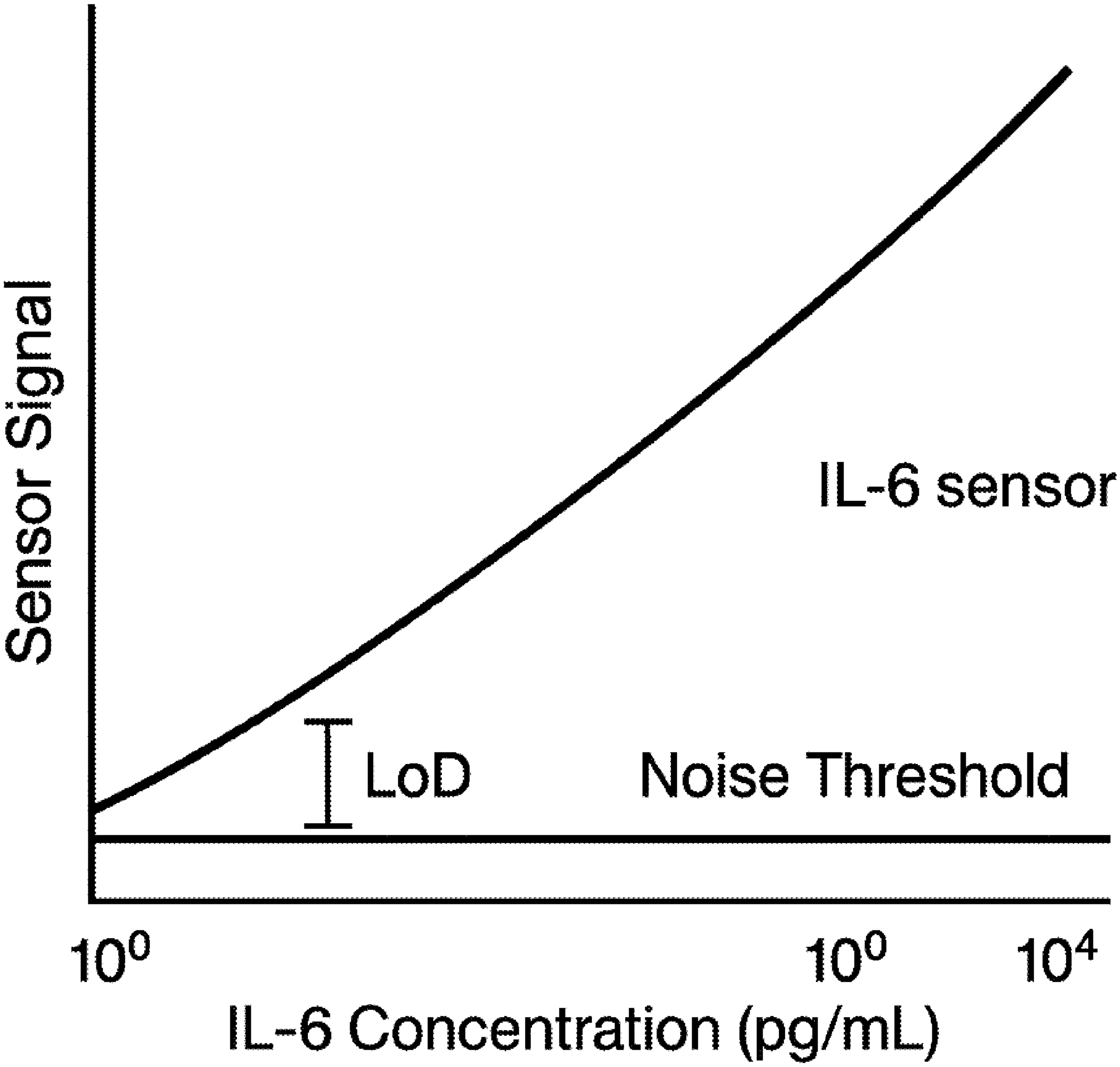

Sensor Signal
IL-6 sensor
LoD
Noise Threshold
$10^0$
$10^0$
$10^4$
IL-6 Concentration (pg/mL)

**FIG. 5-6**

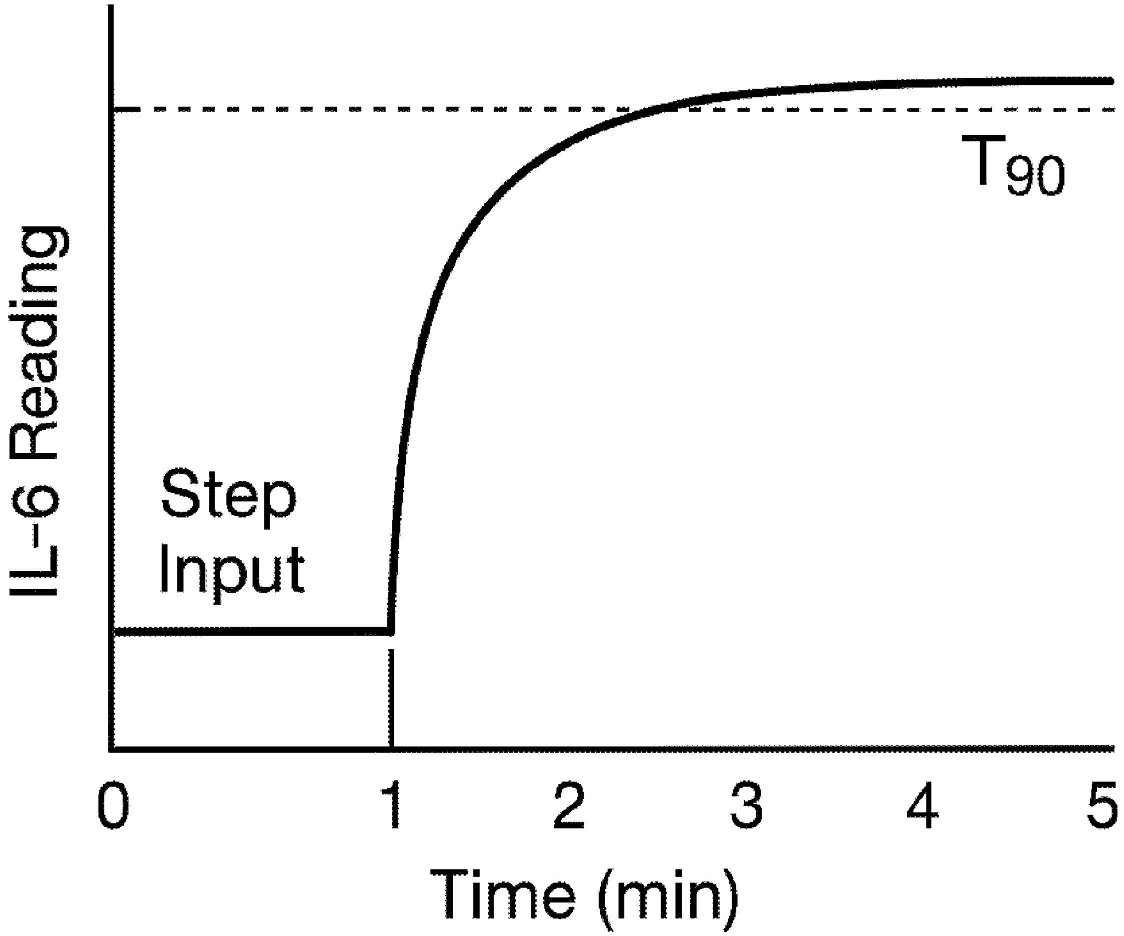


Fig. 5-7

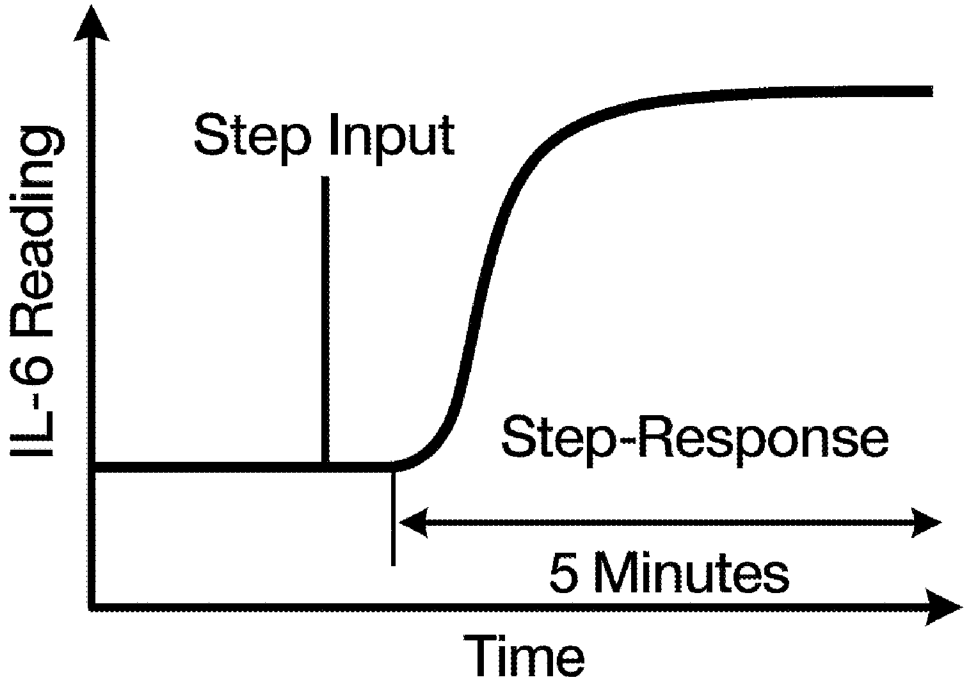


Fig. 5-7

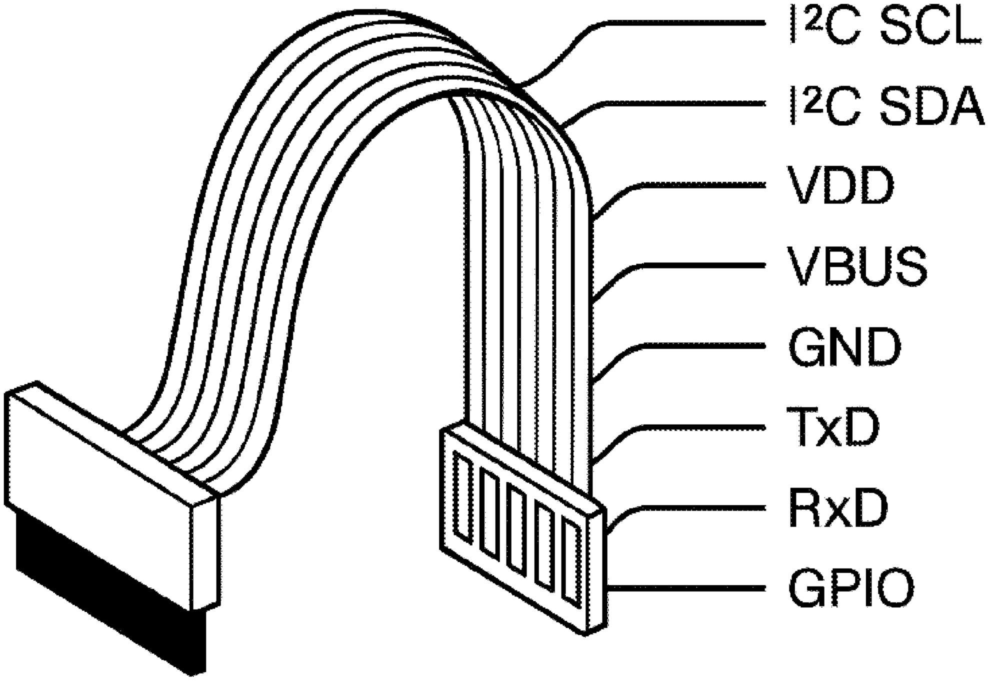


**FIG. 5-8**

Hot-swap ZIF tail and sensor-bus pin-out schematic

Fig 5-9:

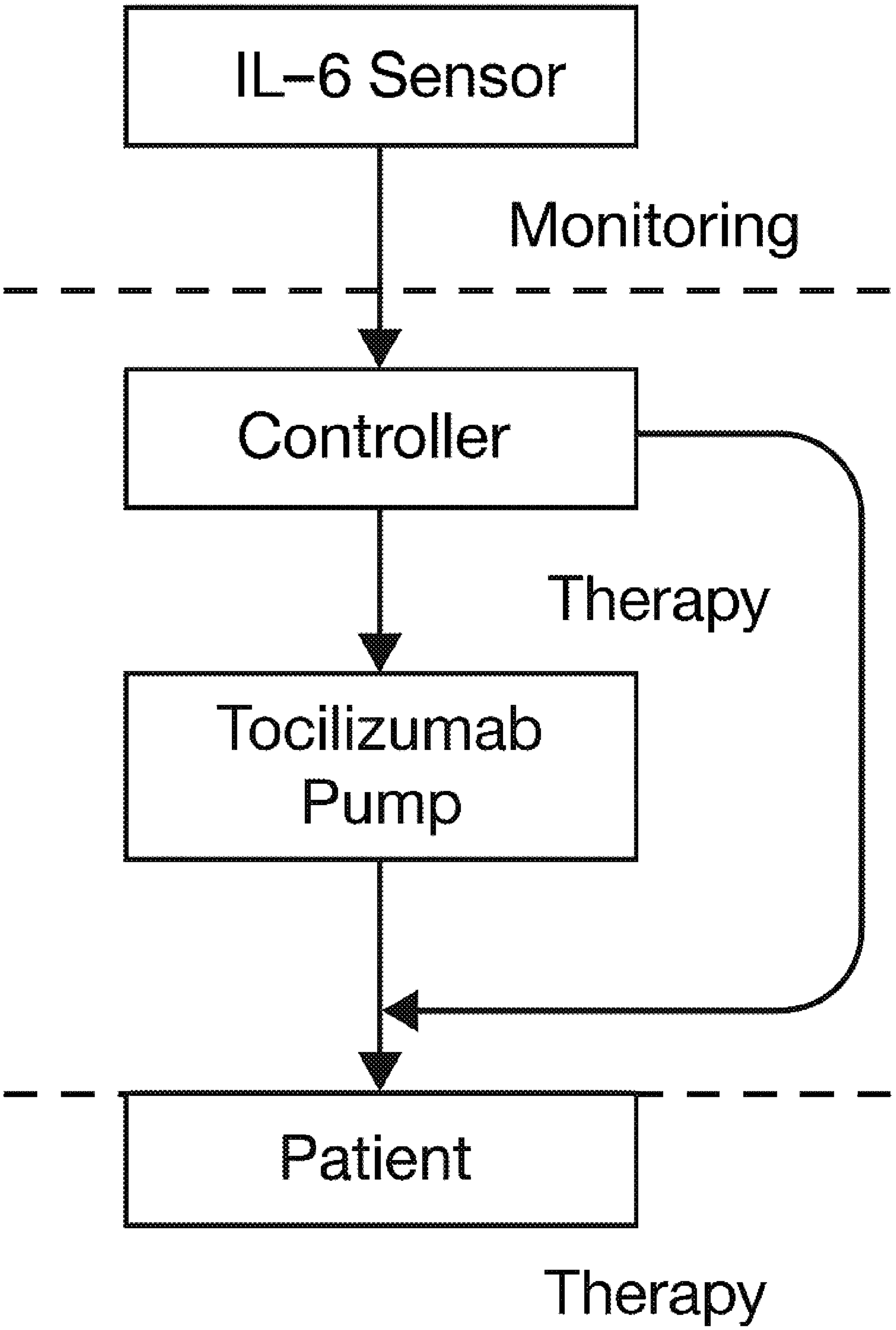


**Fig. 5**
Closed-loop immunomodulator

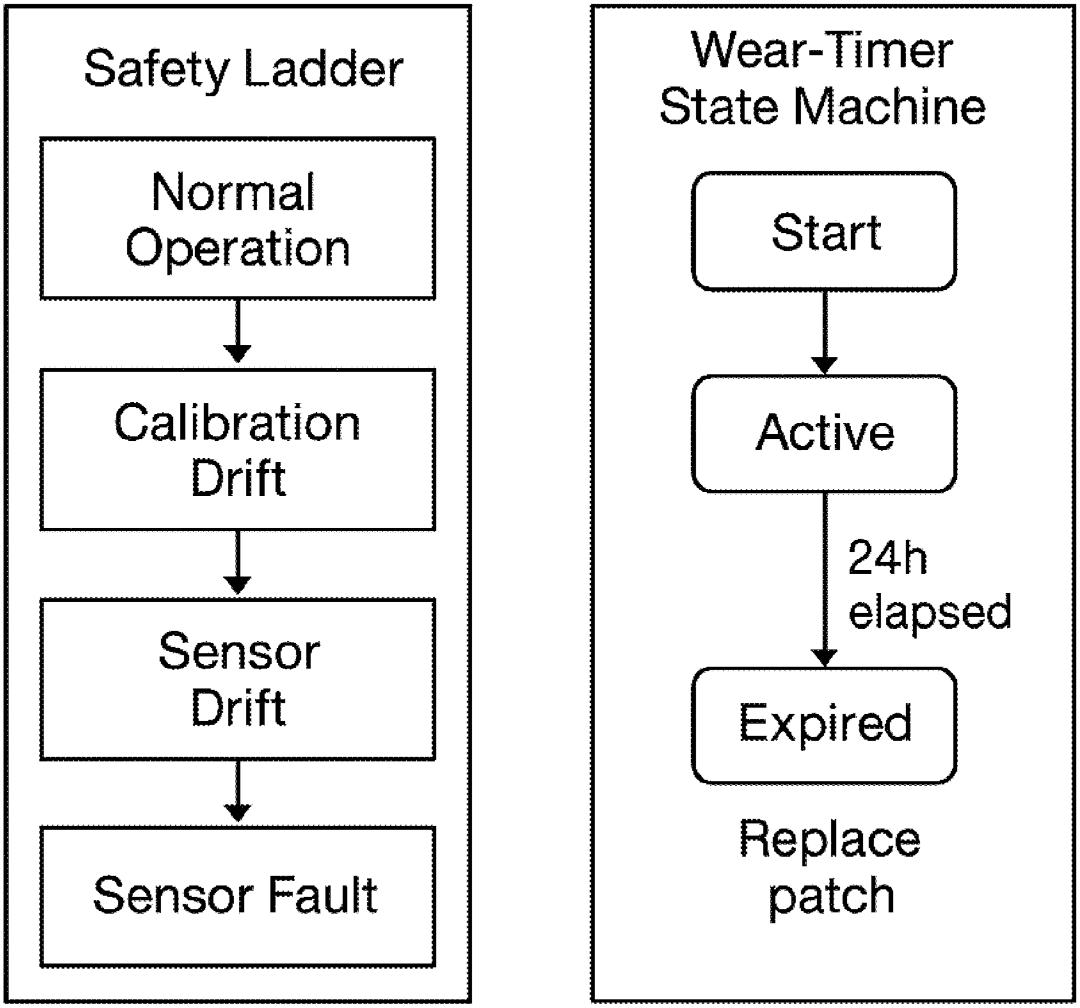

Safety Ladder
Normal Operation
Calibration Drift
Sensor Drift
Sensor Fault
Wear-Timer State Machine
Start
Active
24h elapsed
Expired
Replace patch

FIG. 5-10

| | |
|---|---|
| Calibration | 0x00 |
| UID | 0x1F |
| Wear-Timer | 0x20 |
| Manufacturing | 0x40 |
| Status | 0x6F |
| Spare | 0x70 |
| Checksum | 0x7F |

**FIG. 5-11**

EEPROM address map
of IL-6 module