Introduction to Bioelectricity

Week 5: Applications of bioelectricity
Lecture 5.4: Targeted muscle reinnervation

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Week 5: Applications of bioelectricity

• Lecture 5.4: Targeted muscle reinnervation

T. Kuiken, et al
Lecture 5.4: Targeted muscle reinnervation

- Claudia
Lecture 5.4: Targeted muscle reinnervation

• Barriers to clinical adoption:
  • Electrodes
  • Signal integrity
  • Sensory feedback

• Proposed solution:
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• Application specific integrated circuit (ASIC)

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Layout of full system ASIC designed to amplify, filter, digitize, and transmit intramuscular myoelectric data
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• Wireless powering
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• Telemetry

a) Conventional transmitter architecture

b) New transmitter architecture
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- Full wireless system

![RF Front-end diagram]

- RF powering signal 915 MHz
- RF Clamp
- 8 Stage voltage multiplier
- Voltage limiter
- RF to DC Converter
- RF amplifier
- Frequency /2
- PA
- Beacon detector
- Envelope detector
- Comparator
- Digital
- REG
- Transmission 457.5MHz OOK
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- Power storage
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- Antenna design

![Antenna design diagram with dimensions and labels L = 13 mm, W = 3 mm, ow, gw, tw. The diagram includes a Parylene Substrate and an omnidirectional radiation pattern. Descriptions: Line Meandering, Omnidirectional radiation pattern.]
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• Full system
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- Back to bioelectricity: 1 DOF
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- Back to bioelectricity: 2 DOF