

EP 12

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Neural Interfaces of The Future - Dr. Christopher Chapman

Dr. Christopher Chapman — Bioengineering Researcher



Dr. Christopher Chapman on brain implants that listen for cancer coming back: why they have to be soft and metal-free, and why patients should help design them.

90%

of high-grade gliomas return after surgery [8:11](#)

3–6

months between routine scans today [10:24](#)

7

years he spent as a postdoc [40:09](#)

10–15

years he has worked on implanted devices [0:20](#)

KEY TAKEAWAYS

1 An implant that watches for recurrence

His lab uses brain-computer interface arrays to detect a tumour returning, between scans that are months apart. [8:31](#)

2 It has to work without metal

Radiotherapy must pass through the device, so they are building the whole thing from conductive polymer. [13:09](#)

3 Stiff implants scar the brain

The brain moves around a rigid device, and the inflammation kills the very neurons it was put there to record. [16:06](#)

4 Monitor, decide, then treat

Stimulation is only worth much if a device can sense when it is needed. The hard part is closing that loop in one implant. [23:57](#)

5 Design with patients

Talking to glioblastoma patients changed what he builds. He wants patients involved before a device exists, not after. [42:21](#)

“The human body is really the most interesting machine that there is.”

Dr. Christopher Chapman · [3:31](#)

CHAPTERS

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TERMS EXPLAINED

Glioblastoma

The most aggressive common brain cancer in adults.

Conductive elastomer

A stretchy polymer that carries electrical current, used here in place of metal.

Blood-brain barrier

The lining of the brain's blood vessels that keeps most drugs out.

Brain-computer interface

A device that records from, or stimulates, the brain's electrical activity.

Tumour treating fields

Alternating electric fields that disrupt the division of fast-dividing cancer cells.

Percolation threshold

The amount of conductive filler a material needs before current can cross it.

MENTIONED IN THIS EPISODE

Optune

QV Bioelectronics

Synchron

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Each time opens the video at that moment. Hosted by Arseniy Arsenyev. A summary of a conversation, not medical advice.