



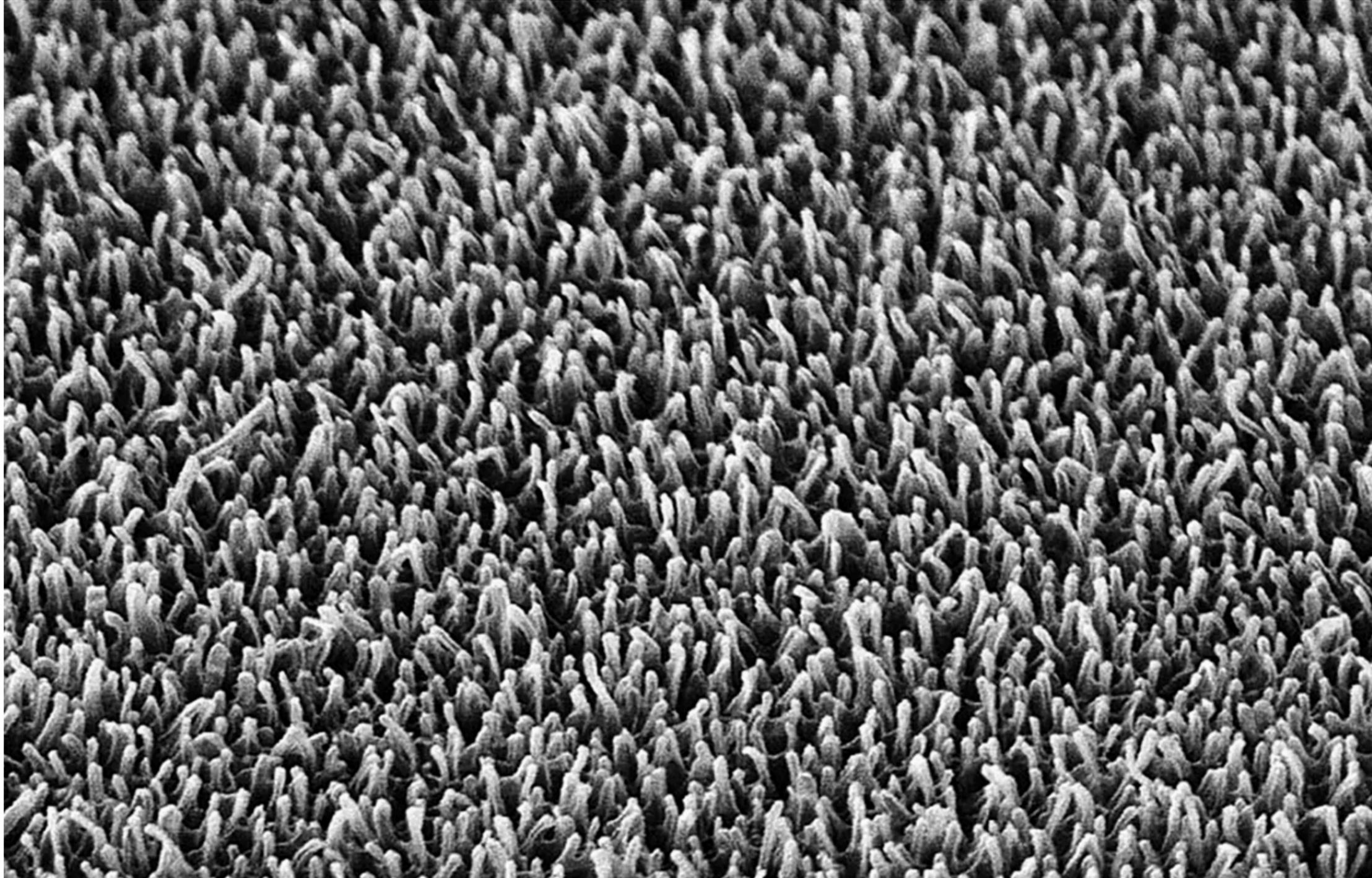
BIG IDEAS FORUM - ANTHEM



Big Ideas Forum is about phrontistery . . a place for thinking / an establishment devoted to education and study. In other words, BIF is an interactive group of curious and engaged people of all backgrounds and ages. We discuss issues that increase our awareness and understanding of the dynamic world around us, be it science, culture, economy, or social issues. Find us on: BigIdeasForum.info. Contact us by email: BigIdeasForum@gmail.com.

Tech Slam - Sept. 7, 2023

Surface modification



Problem:

Hospital infections caused by increasingly drug resistant bacteria*, fungi**

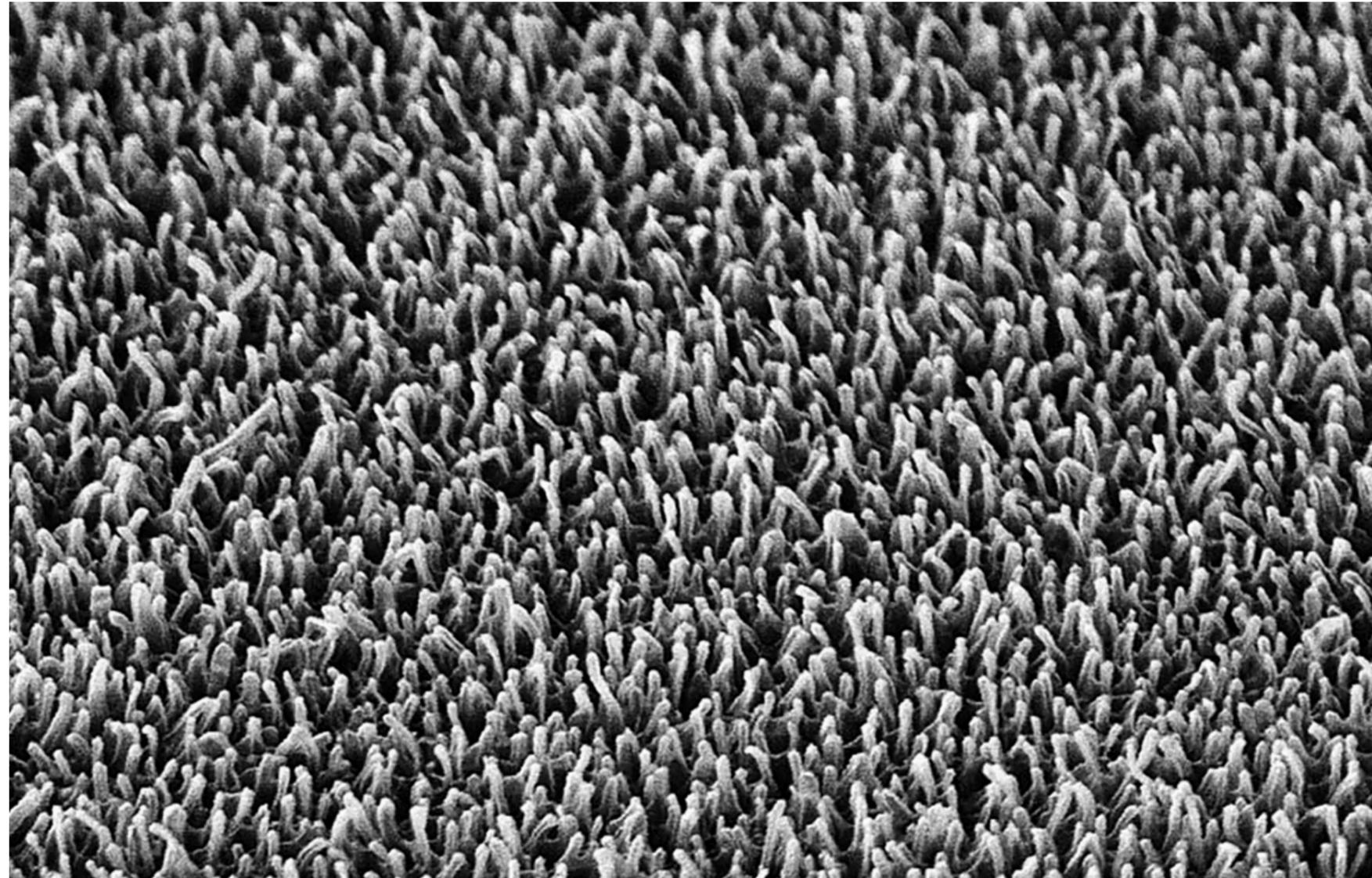
- Harmful/deadly if forming biofilms**
- Poor clinical outcome of surgeries with implants (titanium)**

(*) S. aureus; P. aeruginosa

() Candida**

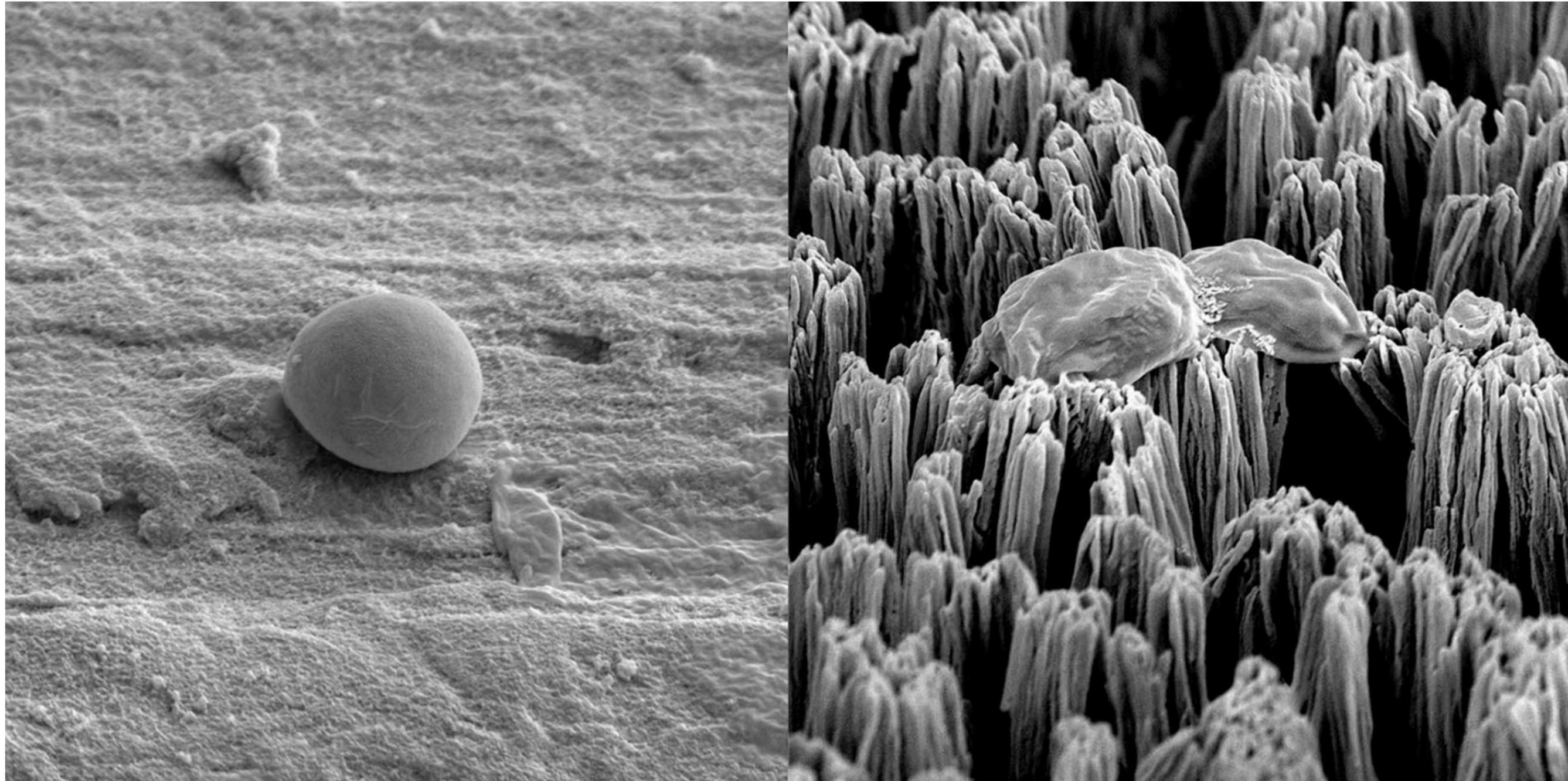
Discovery:

**Grated surfaces kill bacteria
(nano pillars)**



Created by relatively simple plasma etching technique

Surface modification



**Cell structure of microorganisms are ruptured
and cannot be re-generated**

Practical Uses

- in medical devices
- dental applications or for other materials like
- stainless steel benches in food preparation and agriculture and restaurants

Cancer detection



Challenge

Waiting for cancer to grow large enough to be detectable in the bloodstream is too slow, and it doesn't tell you anything about where to find the tumor.

. . . and even slower in a scan

Challenge

Waiting for cancer to grow large enough to be detectable in the bloodstream is too slow, and it doesn't tell you anything about where to find the tumor.

The new questions are:

What if we stopped *searching* for cancer altogether?

Instead:

What if we force the cancer to reveal itself?

Solution

To *bioengineer* a signal that makes early tumors become visible.

Approach - step 1

Bioengineered DNA is injected into the body; when it enters cancer cells, it forces them to produce a synthetic biomarker not found in humans — for example: limonene (a chemical found in the peel of citrus fruits).

If subsequent blood tests find traces of that biomarker, it could be a sign of cancer.

Approach - step 2

The next step is figuring out where *exactly* the cancer is in the body.

- An injected compound forces the cancer cells to produce an enzyme that attaches to a radioactive tracer, rendering it visible to the naked eye in a scan.

Result:

Localizing the cancer makes it treatable—clinicians can use precision radiation or targeted surgery to then take it out.