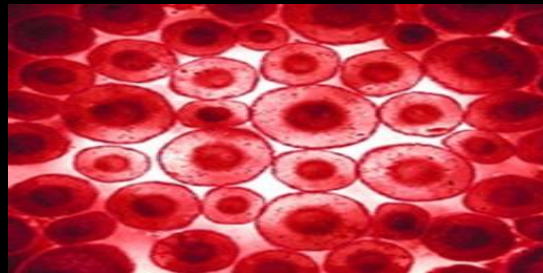


# CFS HIGHLIGHTS 2019: A BIOLOGICAL DIAGNOSIS TOOL?

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Medscape April 2019



# THE FIVE MAIN SYMPTOMS OF CFS

1. Reduction or impairment in ability to carry out normal daily activities, accompanied by **profound fatigue**
2. Post-exertional malaise (worsening of symptoms after physical, cognitive, or emotional effort)
3. Unrefreshing sleep

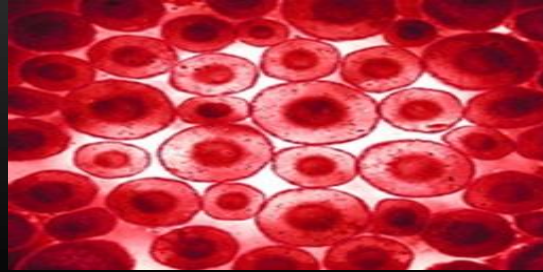
# THE FIVE MAIN SYMPTOMS OF CFS

4. Cognitive impairment
5. Orthostatic intolerance (symptoms that worsen when a person stands upright and improve when the person lies back down)

# SIGNIFICANCE

- ME/CFS afflicts # 2 M. people in the U. States
- A combination of factors might trigger ME/CFS
- There is currently no well-established blood-based biomarker to diagnose it





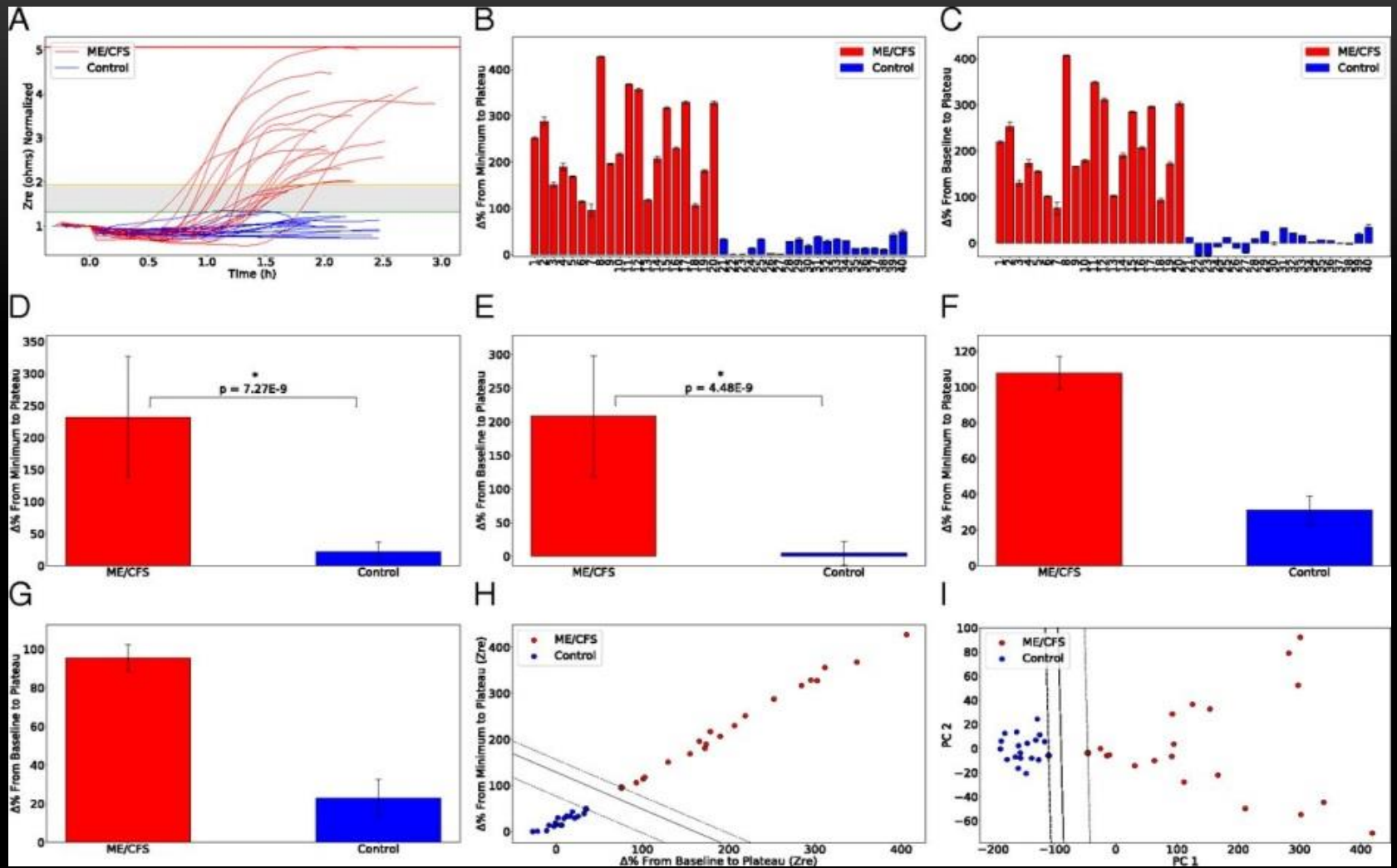
# **A NANO-ELECTRONICS-BLOOD-BASED DIAGNOSTIC BIOMARKER FOR ME/CFS**

**R. Esfandyarpour, A. Kashi,  
M. Nemat-Gorgani, J. Wilhelmy, and R. W. Davis**

**PNAS May 21, 2019 116 (21) 10250-10257; first published April 29, 2019**

# THE MAIN MESSAGE

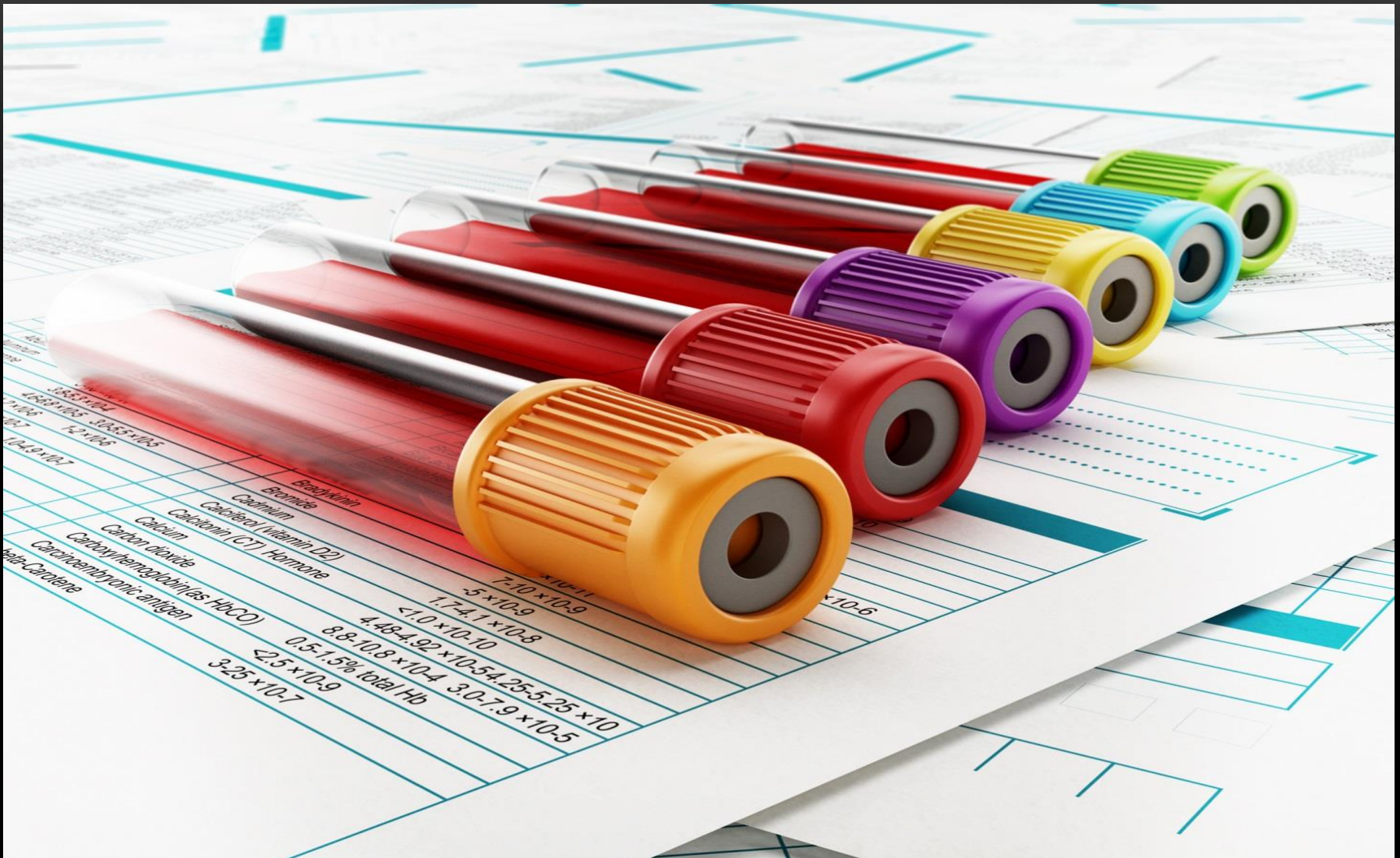
- The assay differentiated blood samples from 20 patients with moderate to severe ME/CFS and 20 healthy control persons with 100% accuracy
- ME/CFS patients were diagnosed using the 2003 Canadian Consensus Criteria

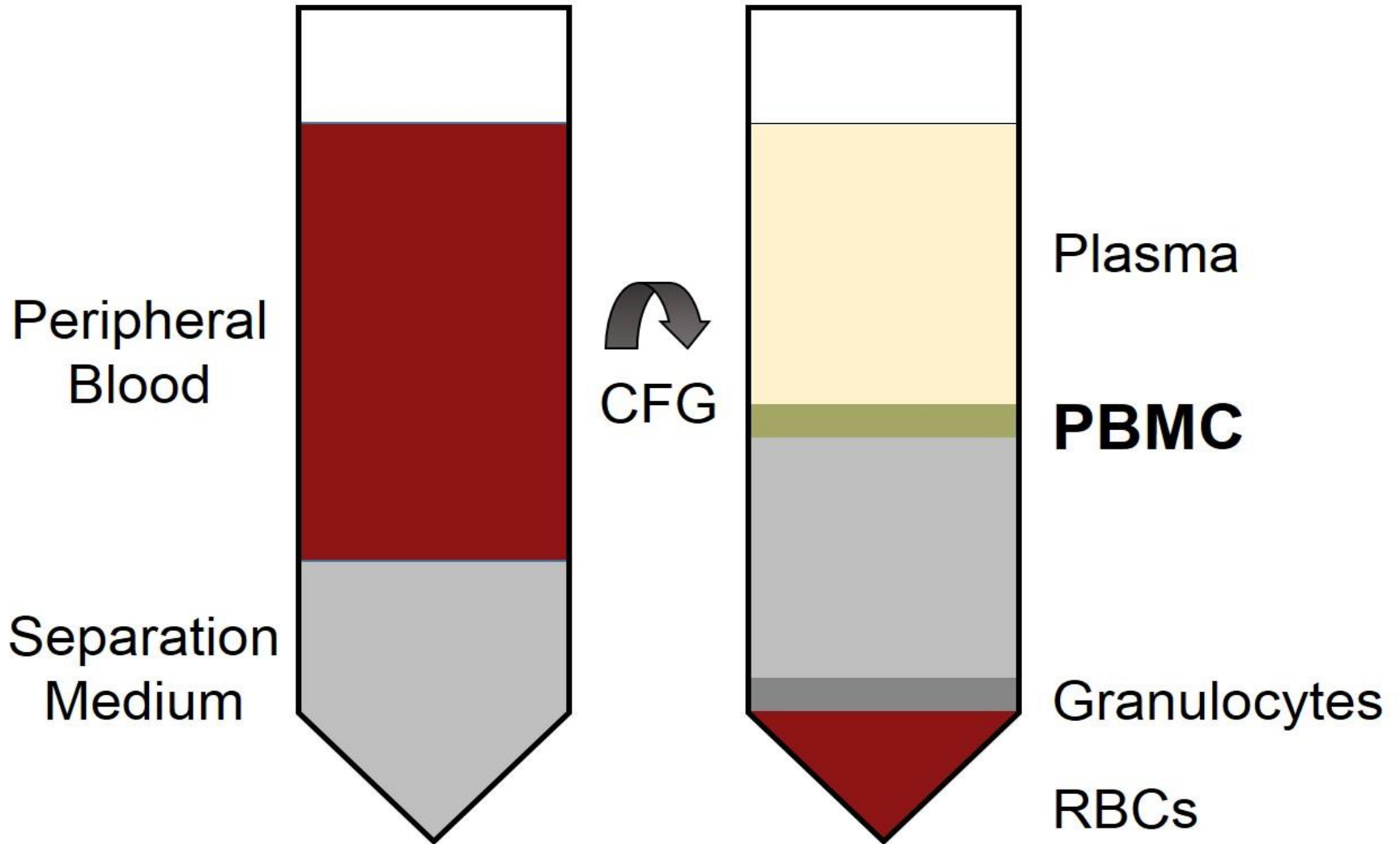




# THE RATIONALE OF THE STUDY

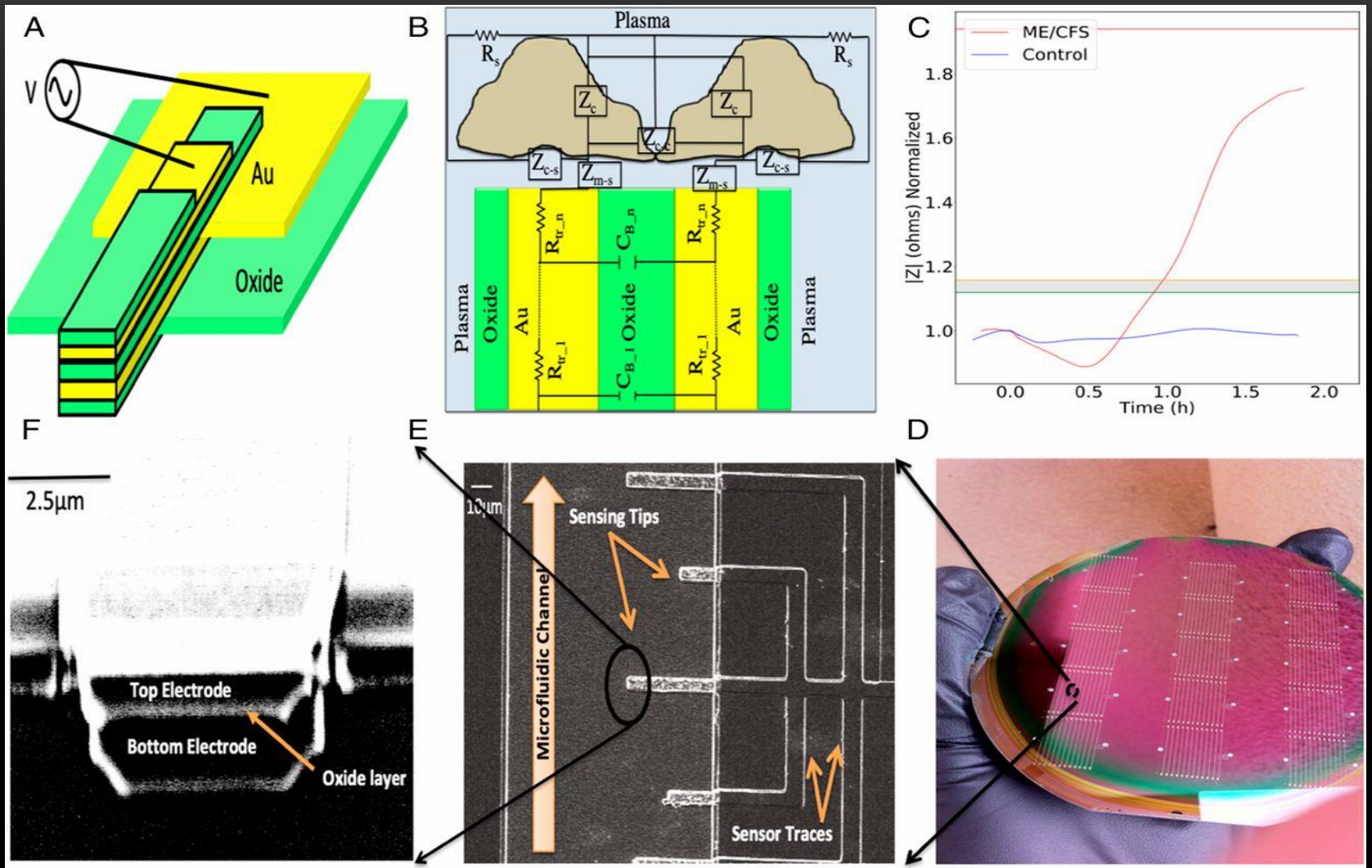
- Previous studies : inducing a biological stressor on peripheral blood cells via hyperosmotic stress forces the cells to consume adenosine triphosphate (ATP)
- ATP : a key metabolite that is hypothesized to be deficient in ME/CFS patients





# THE RATIONALE OF THE STUDY

- New assay
- Nano-needle bio-array
- "directly measures the impedance modulations resulting from cellular and/or molecular interactions"



# THE IDEA AND THE RESULTS

- To mimic the post-exertional malaise
- Adding salt into the patients' peripheral blood cells incubated in their own plasma
- Impedance signals dramatically rose above baseline for the ME/CFS patients
- Remained unchanged in the control persons
- No overlap between the two groups

# HOW IT COMES ?

- Micro/nano fabrication
- Direct electrical detection of cellular and molecular properties
- Artificial intelligence techniques
- Blood-based assay as a diagnostic biomarker
- ? Drug-screening platform



# SUMMARY



- Ultrasensitive assay directly measuring biomolecular interactions in real time, at low cost
- Validated by testing patients with moderate to severe ME/CFS patients vs. healthy controls



# SUMMARY



- ME/CFS samples' response were found:
  - with unique impedance pattern
  - dramatically different from the control ones



**Aldri gi opp!!!**



**Latterkula.no**