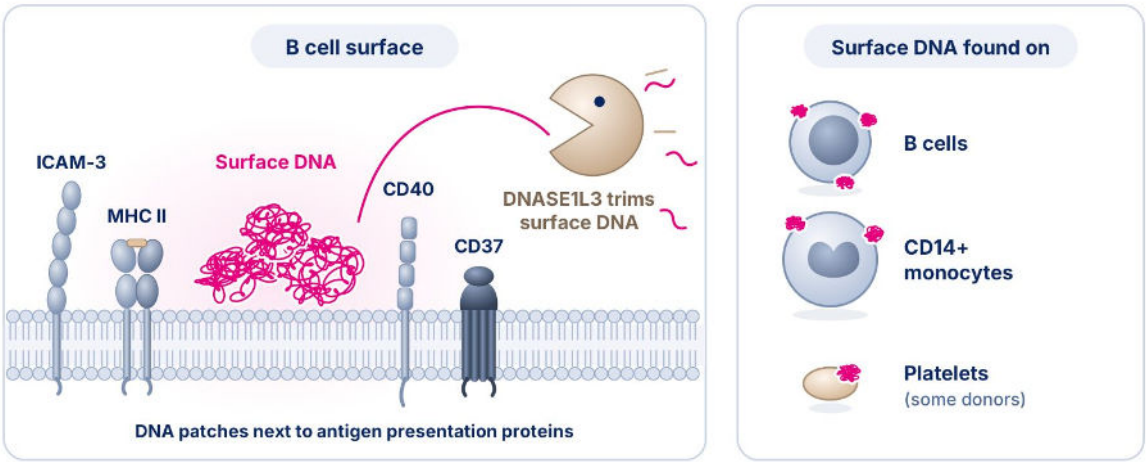
PNA detects surface DNA next to antigen presentation proteins on B cells

Ryan Flynn's lab (Boston Children's Hospital) found mitochondrial DNA on the surface of B cells and monocytes, kept in check by the secreted nuclease DNASE1L3. With the Proximity Network Assay (PNA), they mapped which of 155 surface proteins sit next to this DNA in single cells.



WHAT THE STUDY FOUND

1. **DNA as a PNA target.** Surface DNA was tagged with biotin and read out with a barcoded anti-biotin antibody added to the 155-protein panel.
2. **Cell type specific.** Surface DNA sat mainly on B cells and CD14+ monocytes, and on platelets in some donors. The donor with the DNASE1L3 R206C risk variant had the most on B cells.
3. **Patches close to antigen presenting proteins.** Surface DNA formed patches, bordered by MHC class II, CD40, ICAM-3 and CD37, proteins of the antigen presenting synapse.

WHY IT MATTERS

Anti-DNA antibodies are a hallmark of lupus. By flow cytometry, cells from lupus patients and DNASE1L3 risk-variant carriers had more surface DNA. PNA showed that the DNA patches are placed next to antigen presenting proteins, suggesting that it may play a role in antigen presentation.

Map new targets in the context of more than 150 proteins

Pixelgen Proxiome kits measure abundance, clustering and colocalization of +150 surface proteins per cell. Ask us how this study added a tagged target.

Porat J, et al. DNASE1L3 maintains homeostatic levels of mitochondrial DNA on the mammalian cell surface. Mol Cell 2026;86(20):4291-4309.e11. doi: 10.1016/j.molcel.2026.09.012.

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