Probiotics Restore Enteric HDL3 Secretion and Improve Prognosis in Patients with End-Stage Renal Disease

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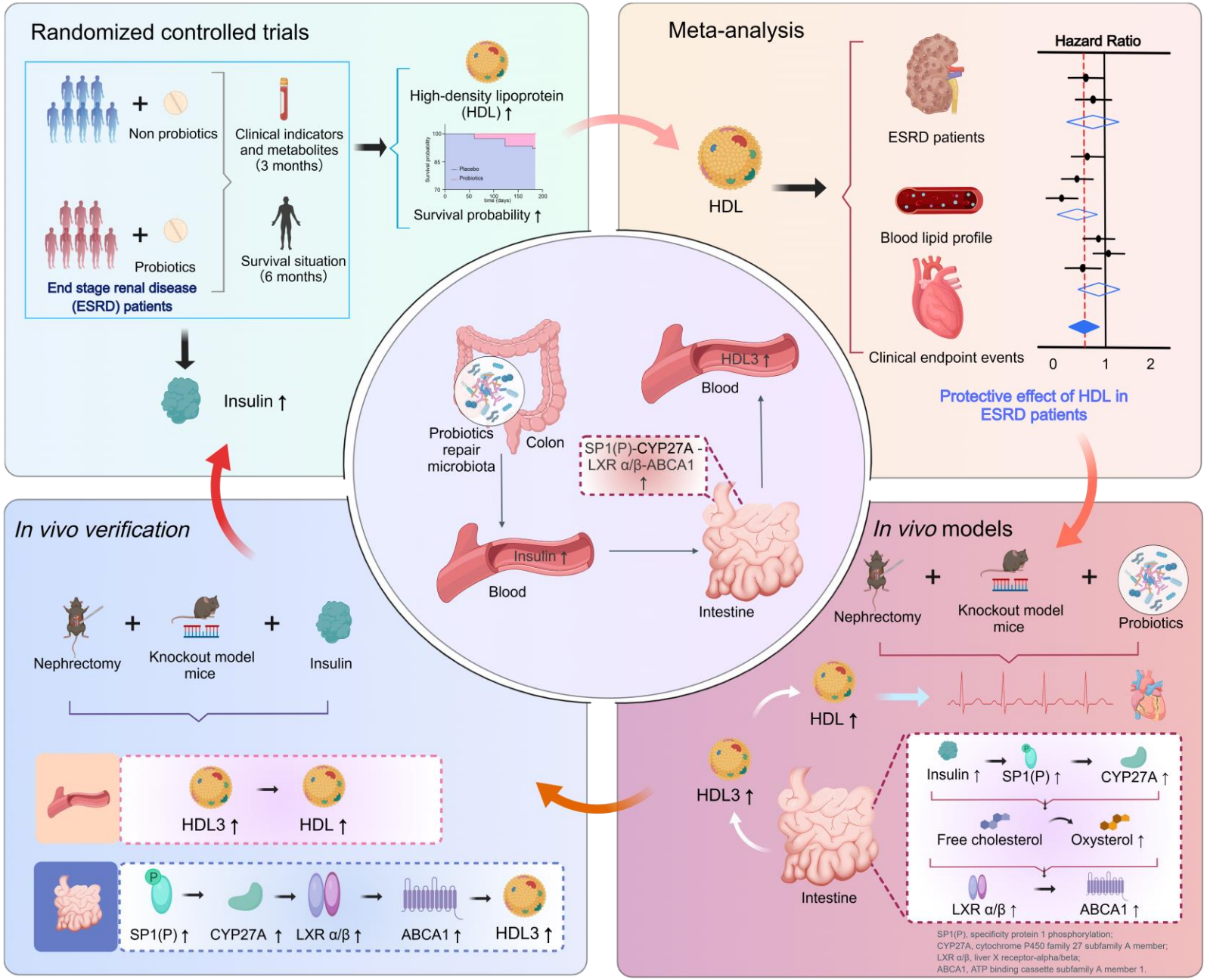
Introduction



Probiotics improve prognosis in patients with ESRD

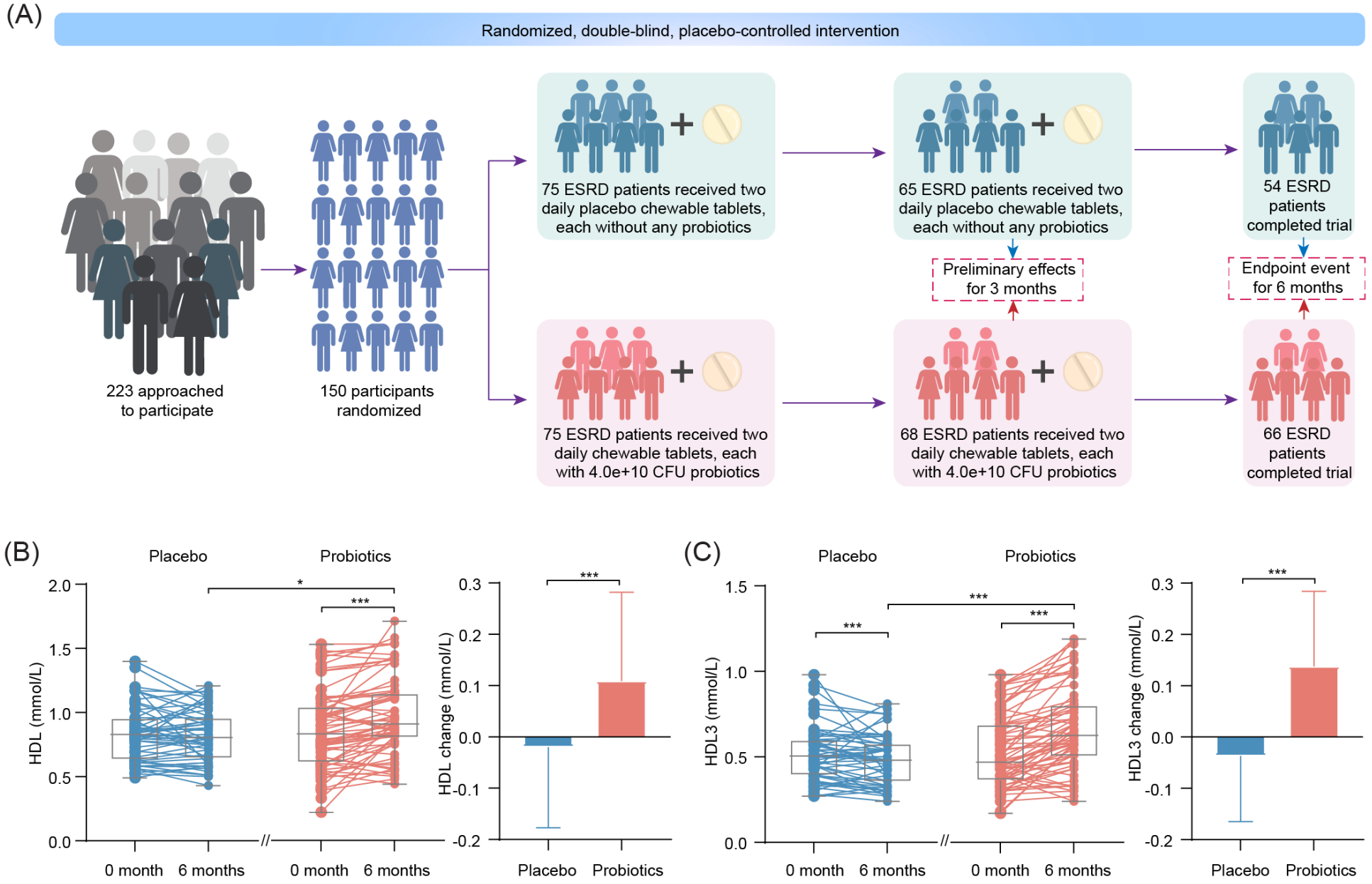


Figure 1. Probiotics improve cardiovascular-related outcomes by elevating HDL levels.

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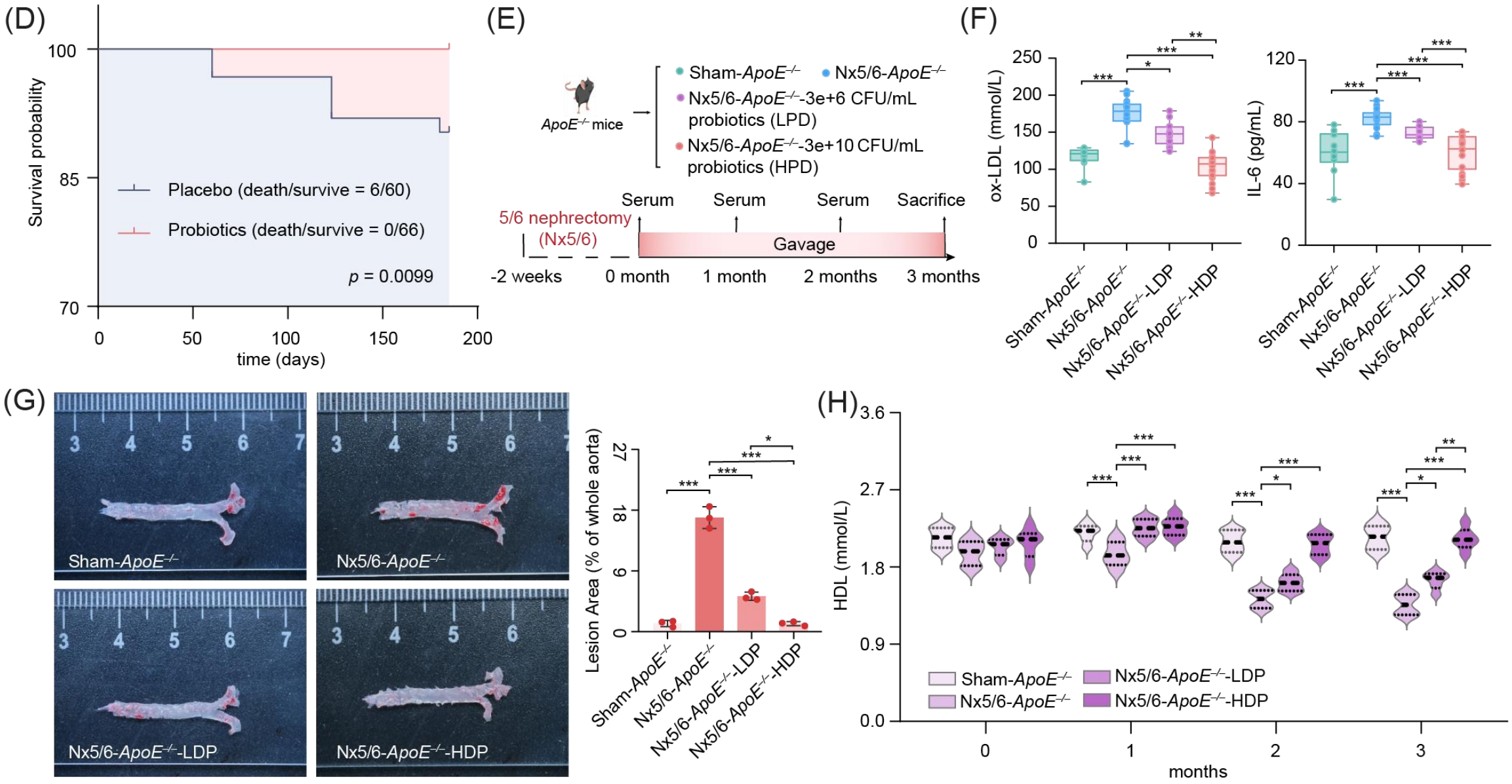

Figure 1. Probiotics improve cardiovascular-related outcomes by elevating HDL levels.

Mechanisms of probiotic-induced HDL elevation in severe kidney injury

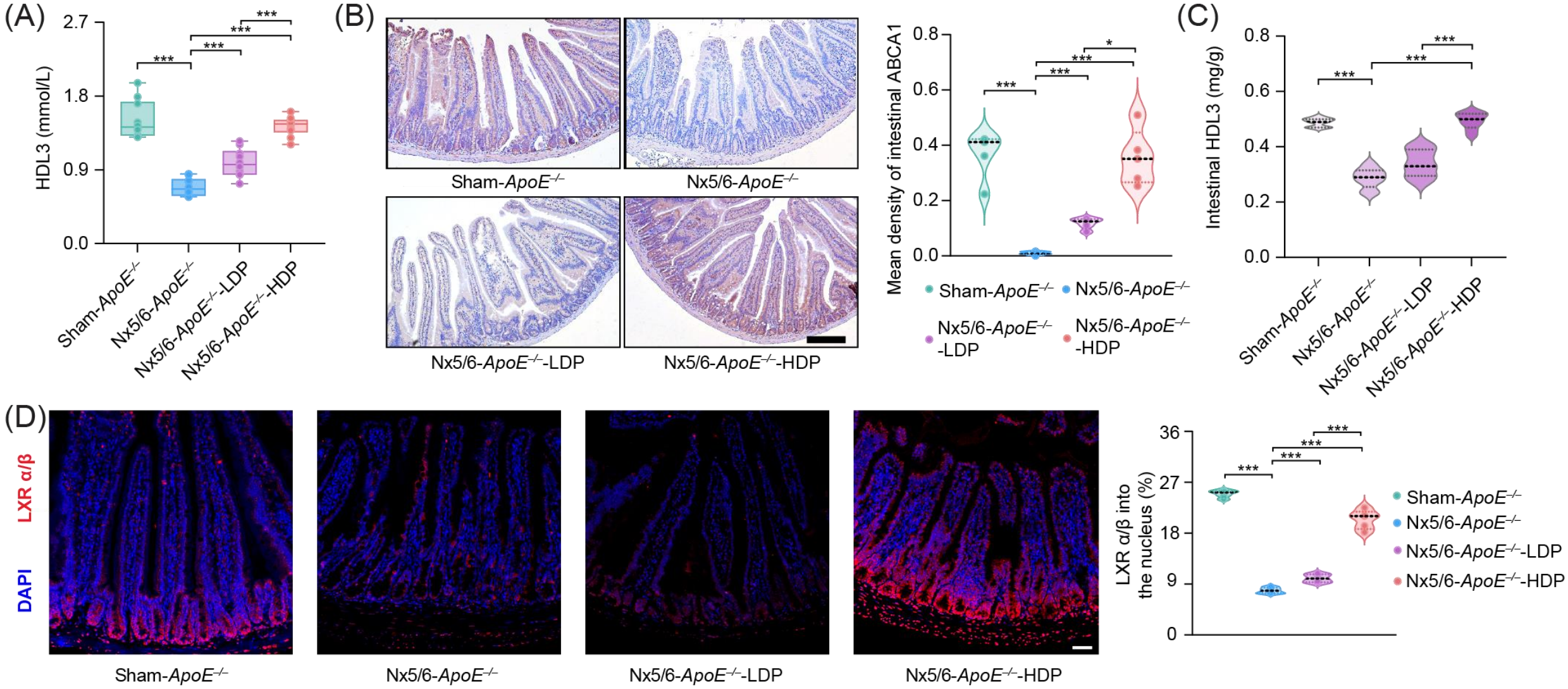

Figure 2. Probiotics modulate the SP1(P)-CYP27A-LXR α/β-ABCA1 pathway in the small intestine by regulating insulin concentrations, thus enhancing HDL3 production.

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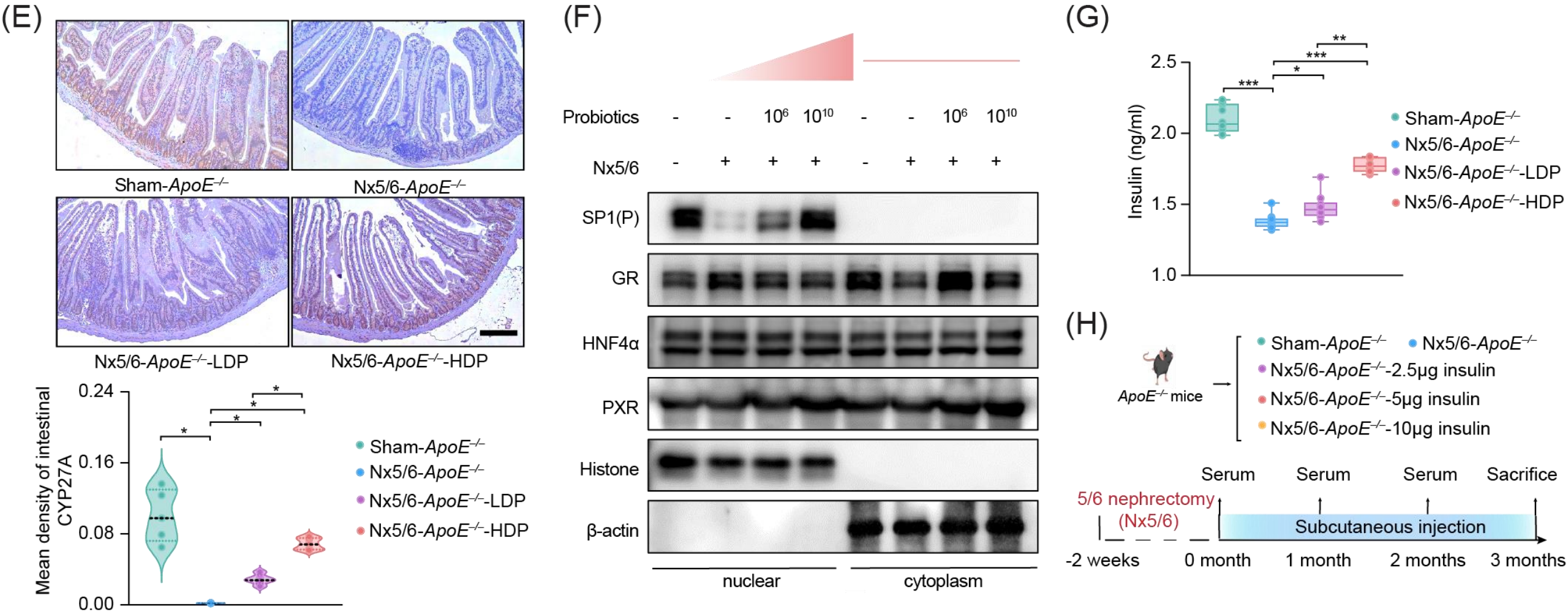

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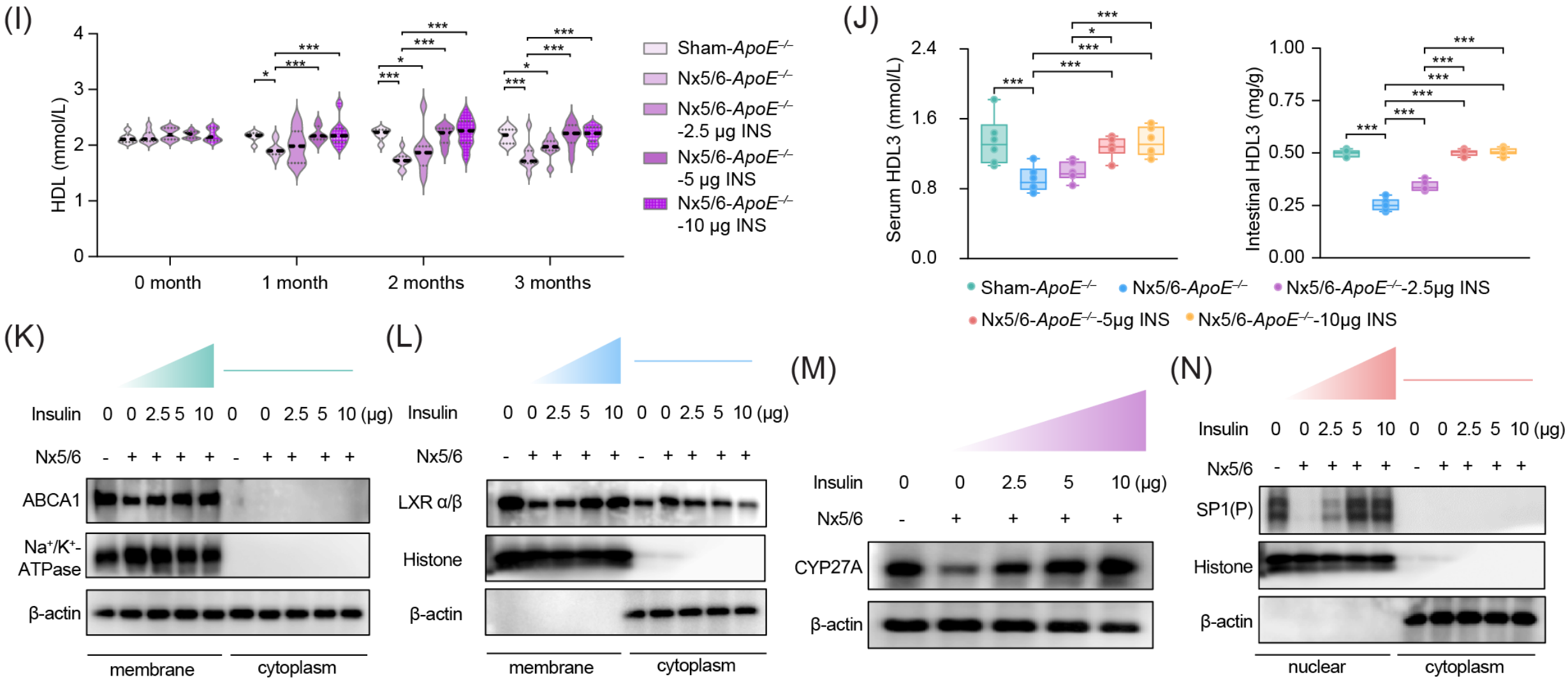

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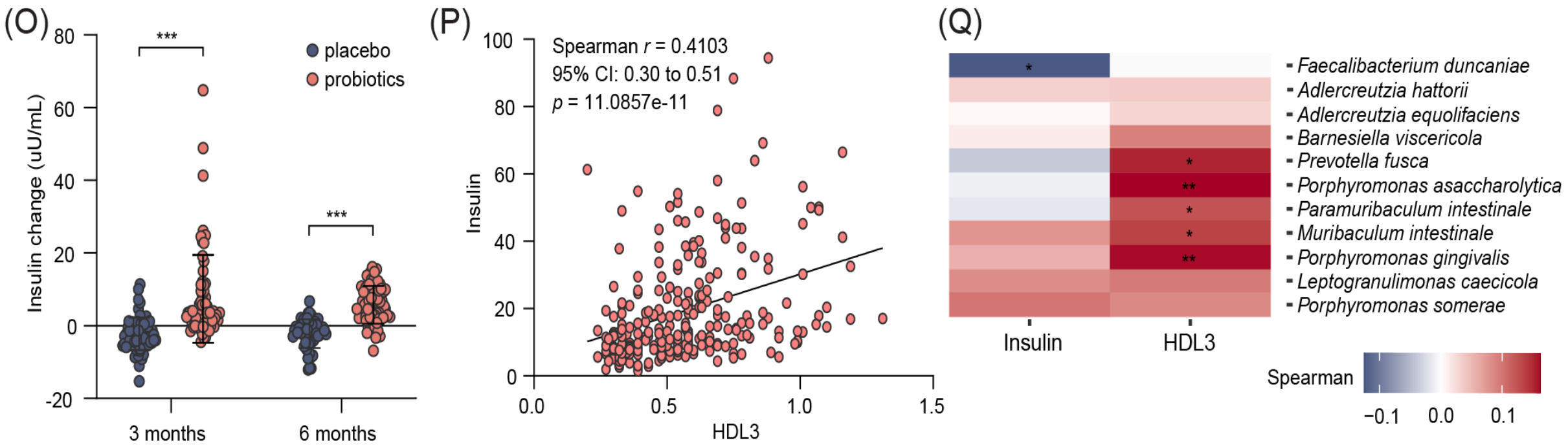

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Summary

- Randomized double-blind trials revealed that mixed probiotics significantly elevated HDL3 levels in ESRD patients, slowing CVD progression and lowering all-cause mortality—offering a novel therapeutic approach for high-risk populations.

- In a 5/6 nephrectomy *ApoE*$^{-/-}$ mouse model, probiotic treatment reduced atherosclerotic plaque burden and restored cardiac function, establishing bidirectional clinical-basic research validation.

- This study uncovered a novel metabolic pathway regulating intestinal ABCA1-dependent HDL3 synthesis via the insulin-SP1(P)-CYP27A-LXRα/β axis, defining the molecular basis of microbiome-host interactions that mitigate CVD risk.

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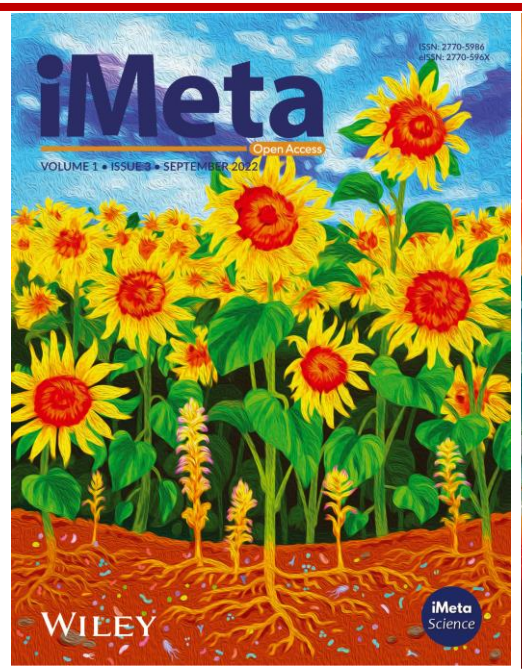

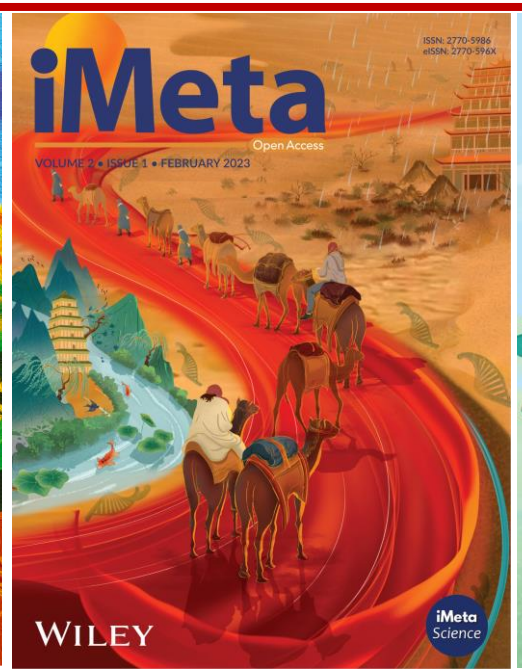

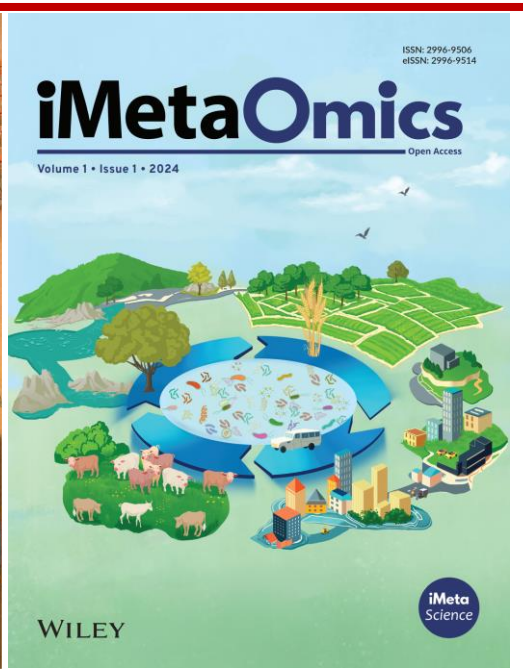

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