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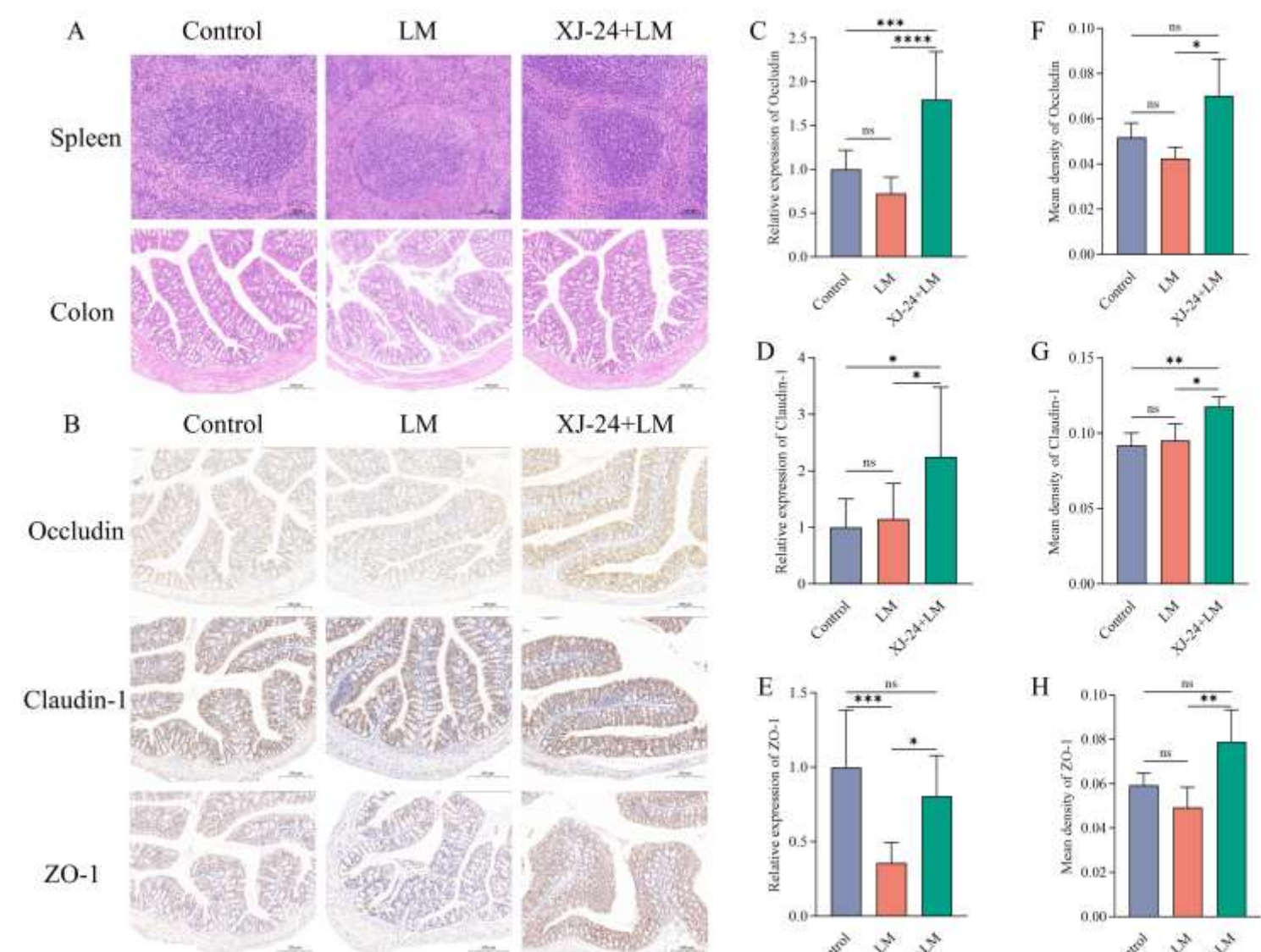
Listeria monocytogenes is a Gram-positive foodborne pathogen that poses serious health risks, especially to vulnerable populations. It disrupts the intestinal barrier, causing systemic infection with a high mortality rate. Currently, there is no clinically approved vaccine for listeriosis, and severe cases depend largely on antibiotic therapy, which is increasingly challenged by rising antibiotic resistance. This underscores the urgent need for innovative, safe, and cost-effective strategies to prevent and treat listeriosis. Numerous studies have demonstrated that lactic acid bacteria hold great promise in preventing and alleviating *L. monocytogenes* infections, providing a strong foundation for the development of novel biotherapeutic approaches.



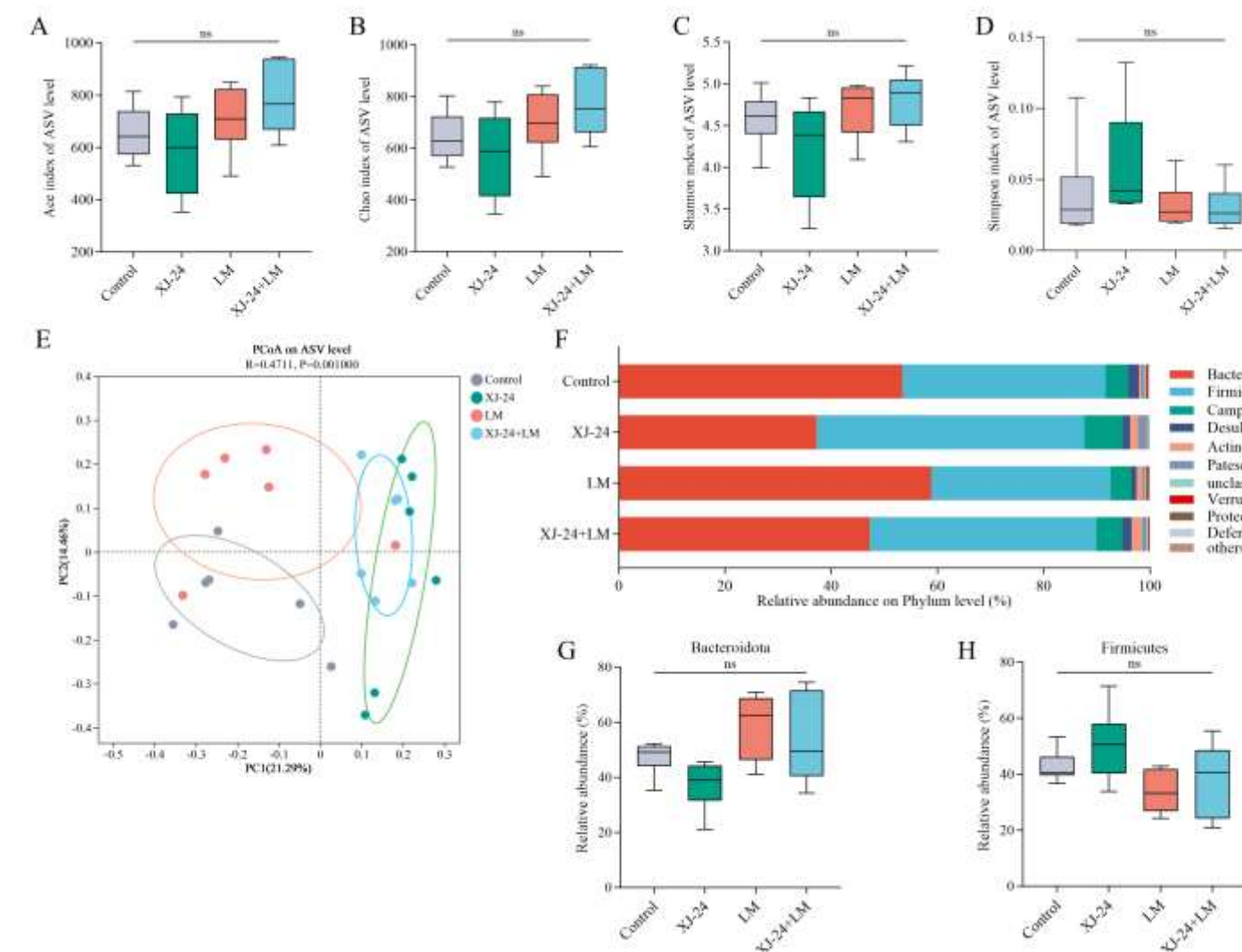
A circular genomic map of the *P. acidilactici* XJ-24 plasmid

Probiotic characteristic-associated genes in *P. acidilactici* XJ-24

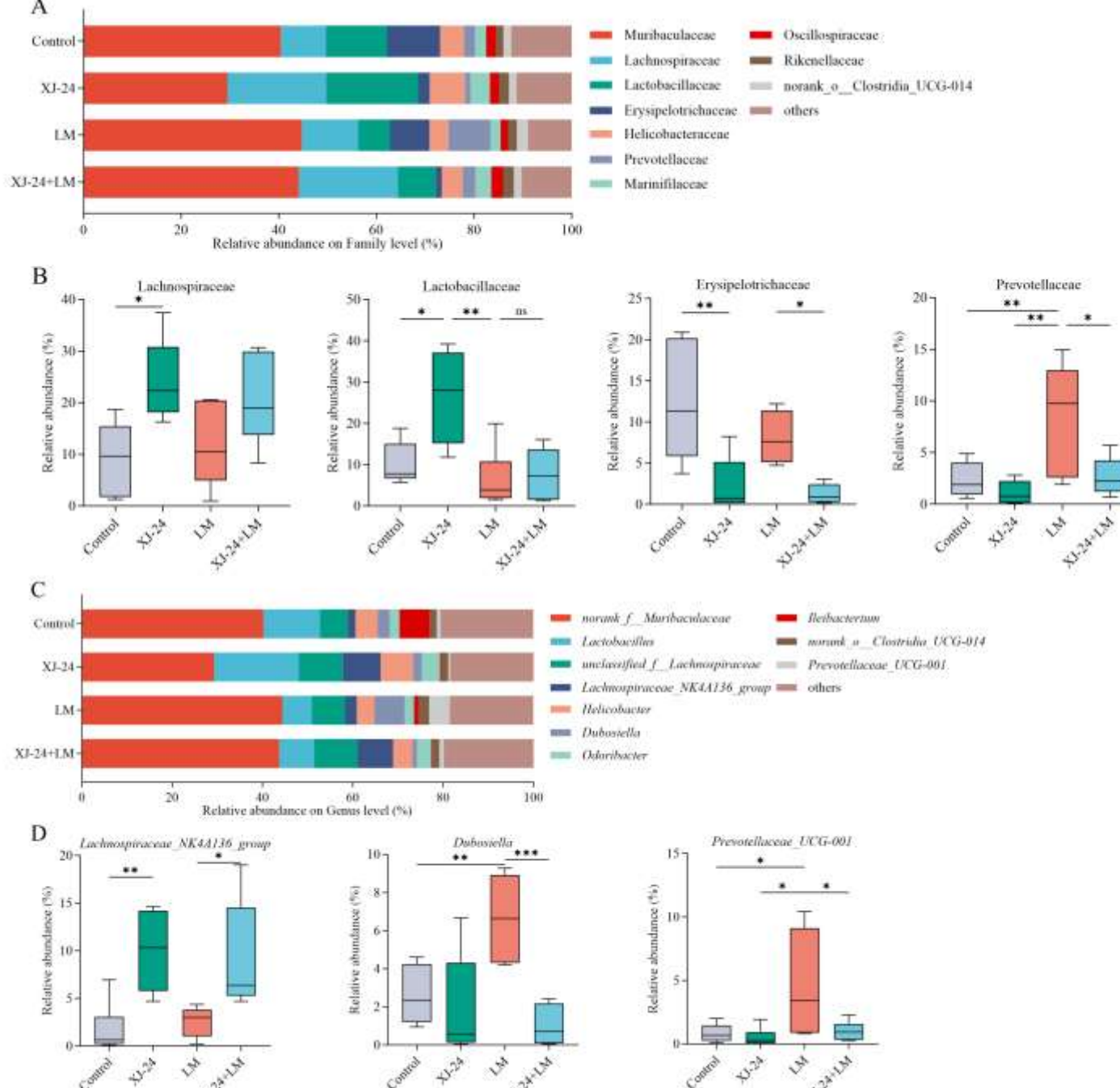
Gene locus	Gene name	Gene function
Universal stress family protein		
ACG4EF_00285	-	universal stress protein
ACG4EF_01025	-	universal stress protein
ACG4EF_01030	-	universal stress protein
ACG4EF_01595	-	universal stress protein
ACG4EF_03305	-	universal stress protein
ACG4EF_07140	-	universal stress protein
Proteases and chaperones		
ACG4EF_02365	<i>clpP</i>	ATP-dependent Clp endopeptidase proteolytic
ACG4EF_05205	<i>hslU</i>	ATP-dependent protease ATPase subunit HslU
ACG4EF_05210	<i>hslV</i>	ATP-dependent protease subunit HslV
ACG4EF_05335	-	ATP-dependent Clp protease ATP-binding subunit
ACG4EF_05700	<i>clpB</i>	ATP-dependent chaperone ClpB
ACG4EF_06340	<i>clpX</i>	ATP-dependent Clp protease ATP-binding subunit ClpX
ACG4EF_07860	-	ATP-dependent Clp protease ATP-binding subunit
Temperature stress		
ACG4EF_02195	<i>groES</i>	co-chaperone GroES
ACG4EF_02200	<i>groL</i>	chaperonin GroEL
ACG4EF_04750	<i>hrcA</i>	heat-inducible transcriptional repressor HrcA
ACG4EF_04760	<i>dnaK</i>	molecular chaperone DnaK
ACG4EF_04765	<i>dnaJ</i>	molecular chaperone DnaJ
ACG4EF_06525	<i>cspA</i>	cold-shock protein
ACG4EF_07950	-	cold-shock protein
Bile tolerance		
ACG4EF_01095	<i>arcD</i>	arginine-ornithine antiporter
ACG4EF_01470	<i>nagB</i>	glucosamine-6-phosphate deaminase
ACG4EF_08565	<i>pyrG</i>	CTP synthase
Acid tolerance		
ACG4EF_07220	<i>atpC</i>	ATP synthase subunit epsilon
ACG4EF_07225	<i>atpD</i>	ATP synthase subunit beta
ACG4EF_07230	<i>atpG</i>	ATP synthase subunit gamma
ACG4EF_07235	<i>atpA</i>	ATP synthase subunit alpha
ACG4EF_07240	<i>atpH</i>	ATP synthase F1 subunit delta
ACG4EF_07245	<i>atpF</i>	ATP synthase subunit B
ACG4EF_07250	<i>atpE</i>	ATP synthase subunit C
ACG4EF_07255	<i>atpB</i>	ATP synthase subunit A
ACG4EF_06250	-	Na ⁺ /H ⁺ antiporter NhaC family protein
ACG4EF_09950	<i>nhaC</i>	Na ⁺ /H ⁺ antiporter NhaC
Alkaline stress		
ACG4EF_09110	<i>amaP</i>	alkaline shock response membrane anchor protein AmaP



Effect of *P. acidilactici* XJ-24 on the histological structure and intestinal barrier integrity in the LM infected mice.



Mice fecal microbiota diversity and relative abundance of the intestinal microbiome in each group at the phylum level



Relative abundance of intestinal microbiome in each group at the family and genus level

Conclusion

Whole-genome analysis revealed that *P. acidilactici* XJ-24, which exhibits strong inhibitory activity against *L. monocytogenes*, possesses favorable probiotic properties and a high degree of safety. Animal experiments further demonstrated that *P. acidilactici* XJ-24 can prevent *L. monocytogenes* infection by reducing pro-inflammatory cytokine levels, alleviating tissue damage in the colon and spleen, enhancing the expression of tight junction proteins, and modulating the gut microbiota.

References

[4] Hu, W.; Zhou, S.; Ibrahim, A.; Li, G.; Awad, S.; Ramos-Vivas, J.; Kan, J.; Du, M. Whole Genome Analysis of *Pediococcus acidilactici* XJ-24 and Its Role in Preventing *Listeria monocytogenes* ATCC® 19115™ Infection in C57BL/6 Mice. *Antibiotics* 2025, 14, 323.

[2] Hu, W.; Li, H.; Shi, Z.; Yang, X.; Yi, Z.; Zhou, S.; Kan, J.; Du, M. Screening and in situ inhibitory effects of probiotic lactic acid bacteria against *Listeria monocytogenes*. *Food Ferment. Ind.* 2024. Available online: <https://doi.org/10.13995/j.cnki.11-1802/ts.039915>

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