



野生大熊猫不同繁殖状态下激素与肠道微生物群关联的性别二态性

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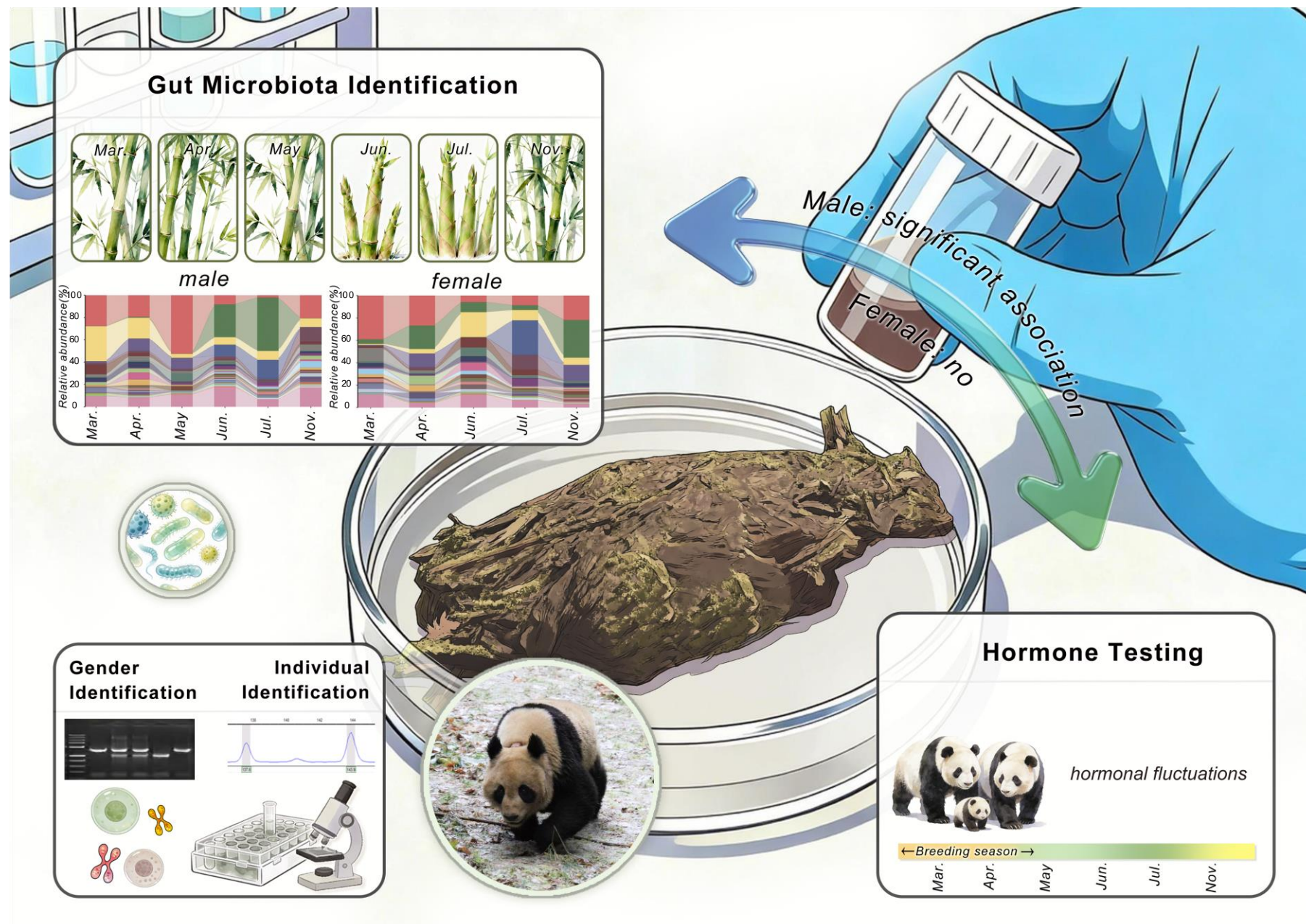
³栗子坪大熊猫生态与保护四川省野外科学观测研究站



Qinlong Dai, Xinyuan Cui, Chenyi Gao, Xiaoxiao Tang, Kaizhi Wen, Minhui Shi, Chen Zhang, et al. 2026.
Sexual dimorphism in hormone-gut microbiome associations across reproductive states in wild giant pandas.
iMetaOmics 3: e70108. <https://doi.org/10.1002/imo2.70108>



简介及亮点





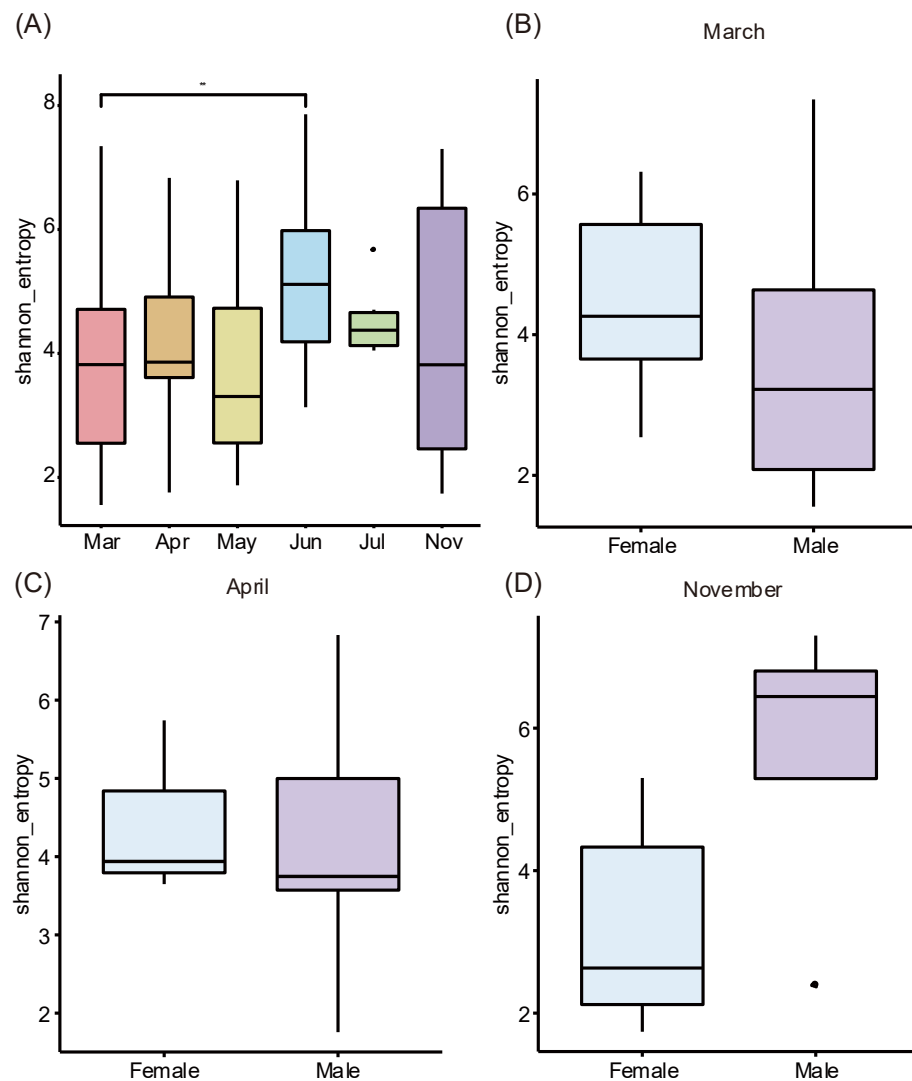
结果1：个体鉴定

Sample ID	Individual	Released individuals	Sex
1Mar04	I1	HY	Female
2Mar01	I2	TT	Male
2Mar02	I2	TT	Male
2Mar03	I2	TT	Male
2Mar05	I2	TT	Male
2Mar07	I2	TT	Male
2Mar08	I2	TT	Male
2Mar09	I2	TT	Male
2Mar11	I2	TT	Male
2Mar12	I2	TT	Male
2Mar15	I2	TT	Male
2Mar16	I2	TT	Male
2Mar31	I2	TT	Male
2Nov38	I2	TT	Male
3Mar10	I3	\	Male
4Mar13	I4	\	Female
4Nov16	I4	\	Female
4Nov19	I4	\	Female
5Mar20	I5	\	Female
5Mar23	I5	\	Female
5Mar26	I5	\	Female
6Mar27	I6	\	Female
7Mar32	I7	\	\
8Mar36	I8	\	Female
9Mar38	I9	\	\
10Mar40	I10	\	Male
11Mar24	I11	\	Male
11Mar28	I11	\	Male
11Apr02	I11	\	Male
11Apr08	I11	\	Male
12May01	I12	\	Male

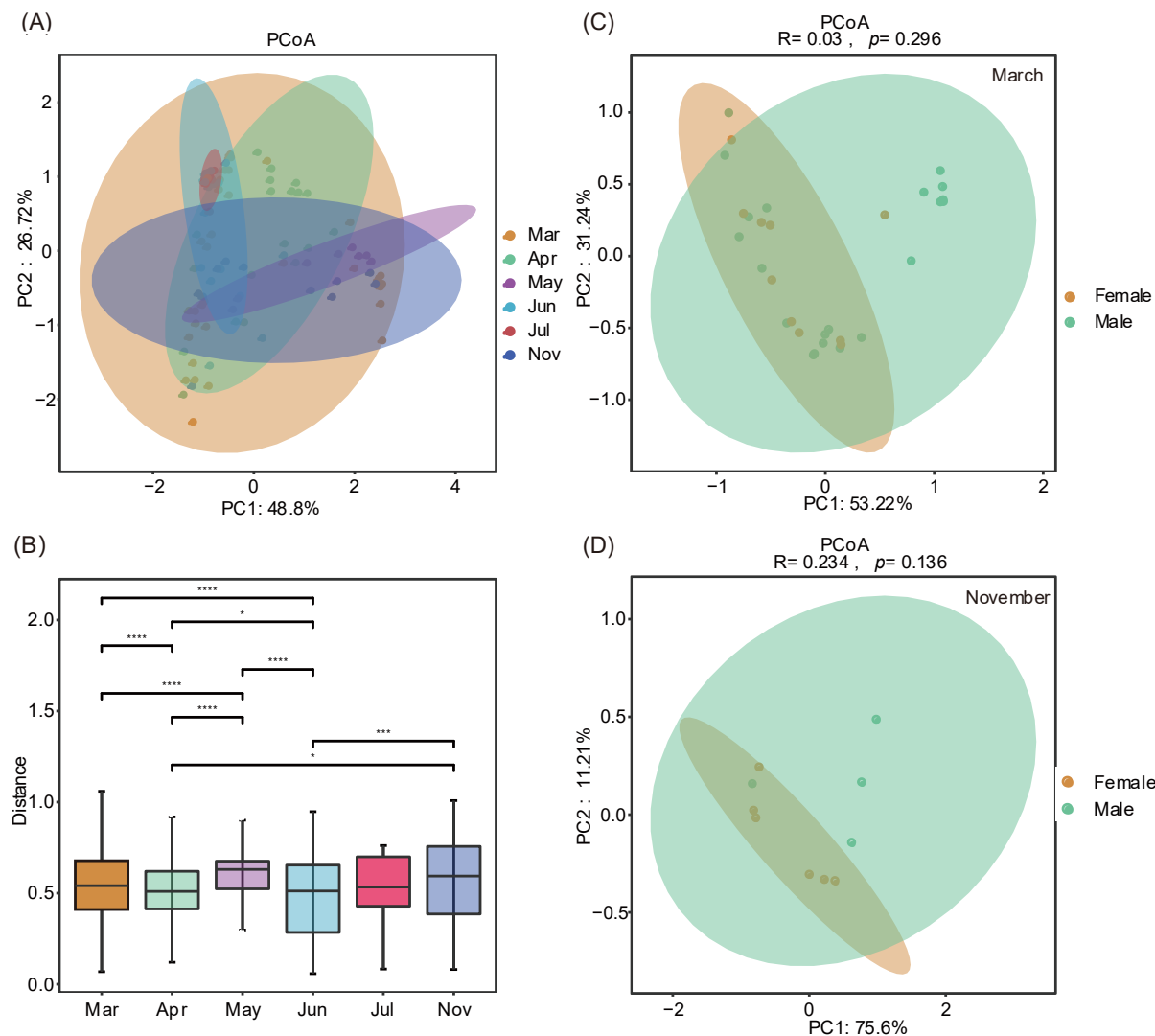
Sample ID	Individual	Released individuals	Sex
13May04	I13	\	Male
14Jun04	I14	\	\
15Jun05	I15	\	Male
16Jun03	I16	\	\
16Jun06	I16	\	\
17Jun11	I17	\	Male
18Jun13	I18	\	Female
19Jun18	I19	\	Male
20Jun16	I20	\	Male
20Jul01	I20	\	Male
21Jul03	I21	\	Male
22Mar17	I22	\	Male
22May02	I22	\	Male
22Jun01	I22	\	Male
22Jun02	I22	\	Male
22Jun09	I22	\	Male
22Jun12	I22	\	Male
22Jul02	I22	\	Male
22Jul04	I22	\	Male
22Jul05	I22	\	Male
23Jul06	I23	\	Female
24Nov03	I24	\	Male
26Nov07	I25	\	Female
27Nov61	I26	BX	Male
28Nov27	I27	\	Female
29Nov55	I28	\	Male
30Nov36	I29	\	Female
31Nov40	I30	\	Female
32Nov43	I31	\	Female
32Nov44	I31	\	Female
2Mar14	I32	TT	Male



结果2：肠道微生物的季节性变化及性别差异



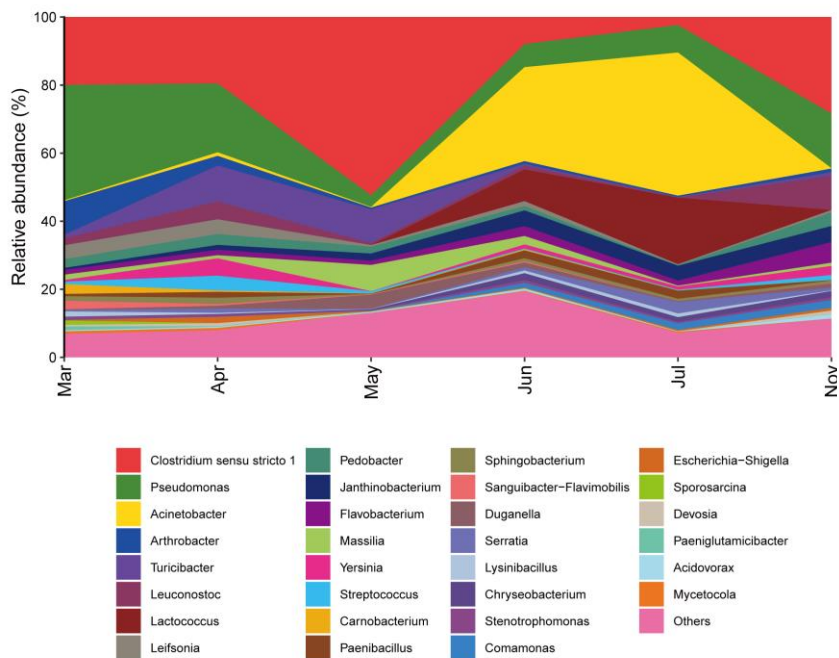
肠道微生物 α 多样性在不同月份及两性间的差异



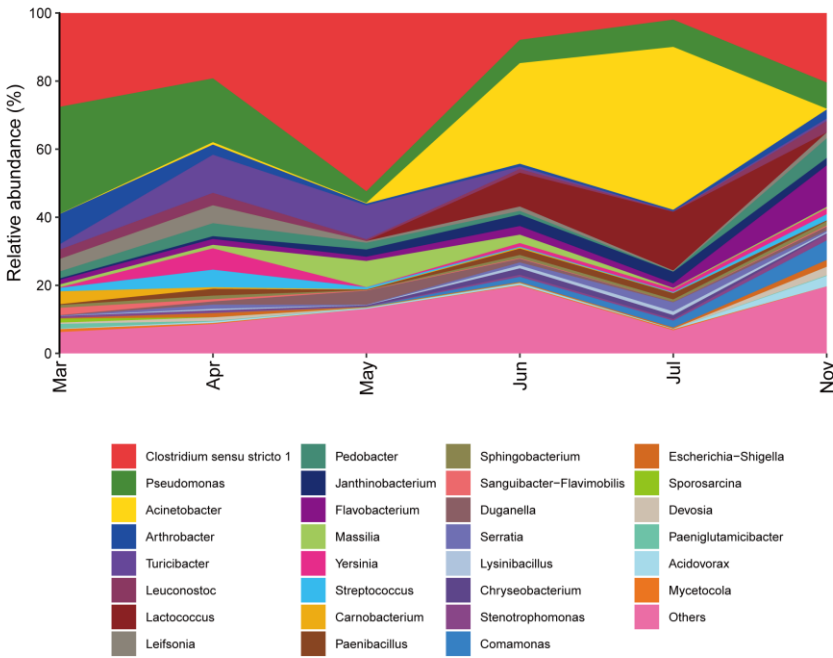
肠道微生物 β 多样性在不同月份及两性间的差异



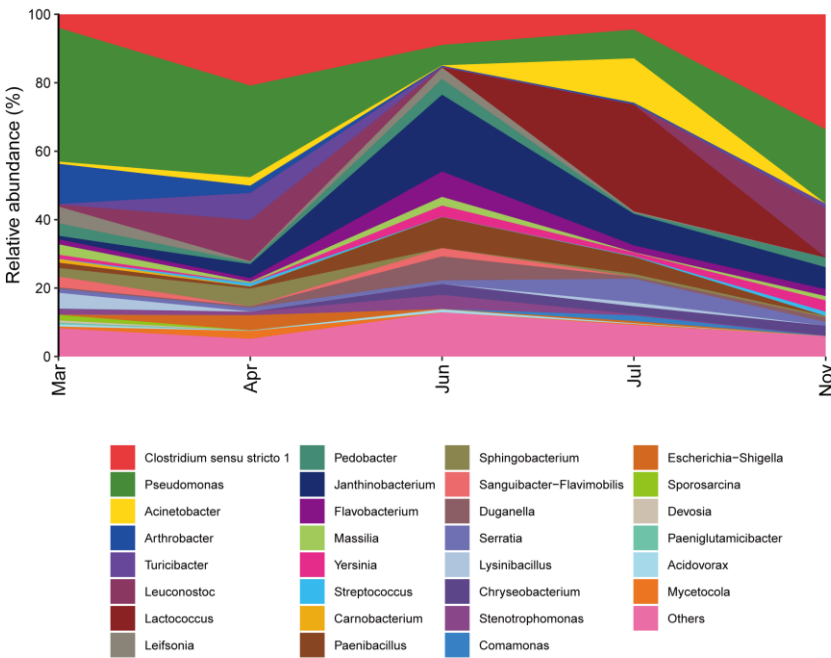
结果2：肠道微生物的季节性变化及性别差异



全体大熊猫肠道微生物组成的季节变化



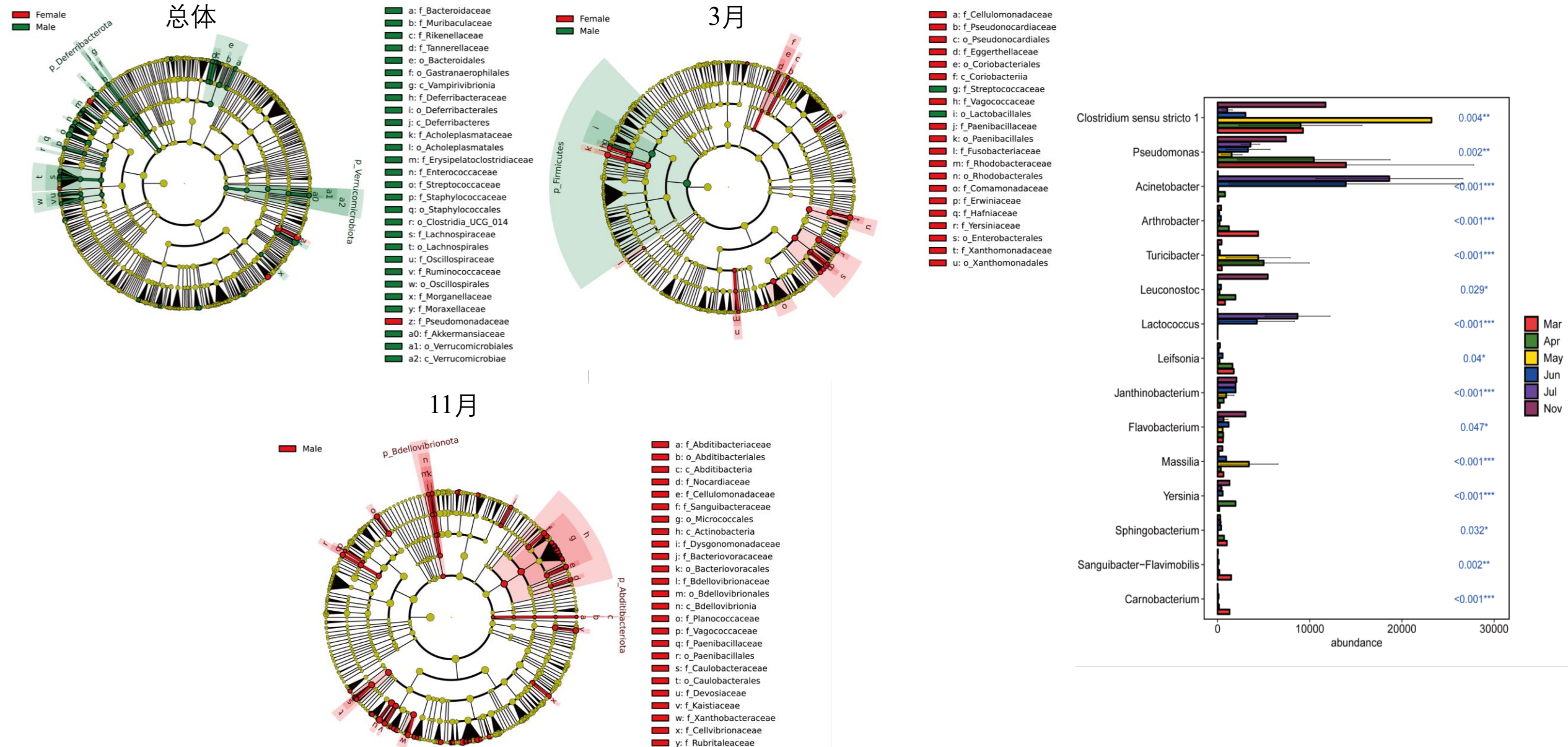
雄性大熊猫肠道微生物组成的季节变化



雌性大熊猫肠道微生物组成的季节变化

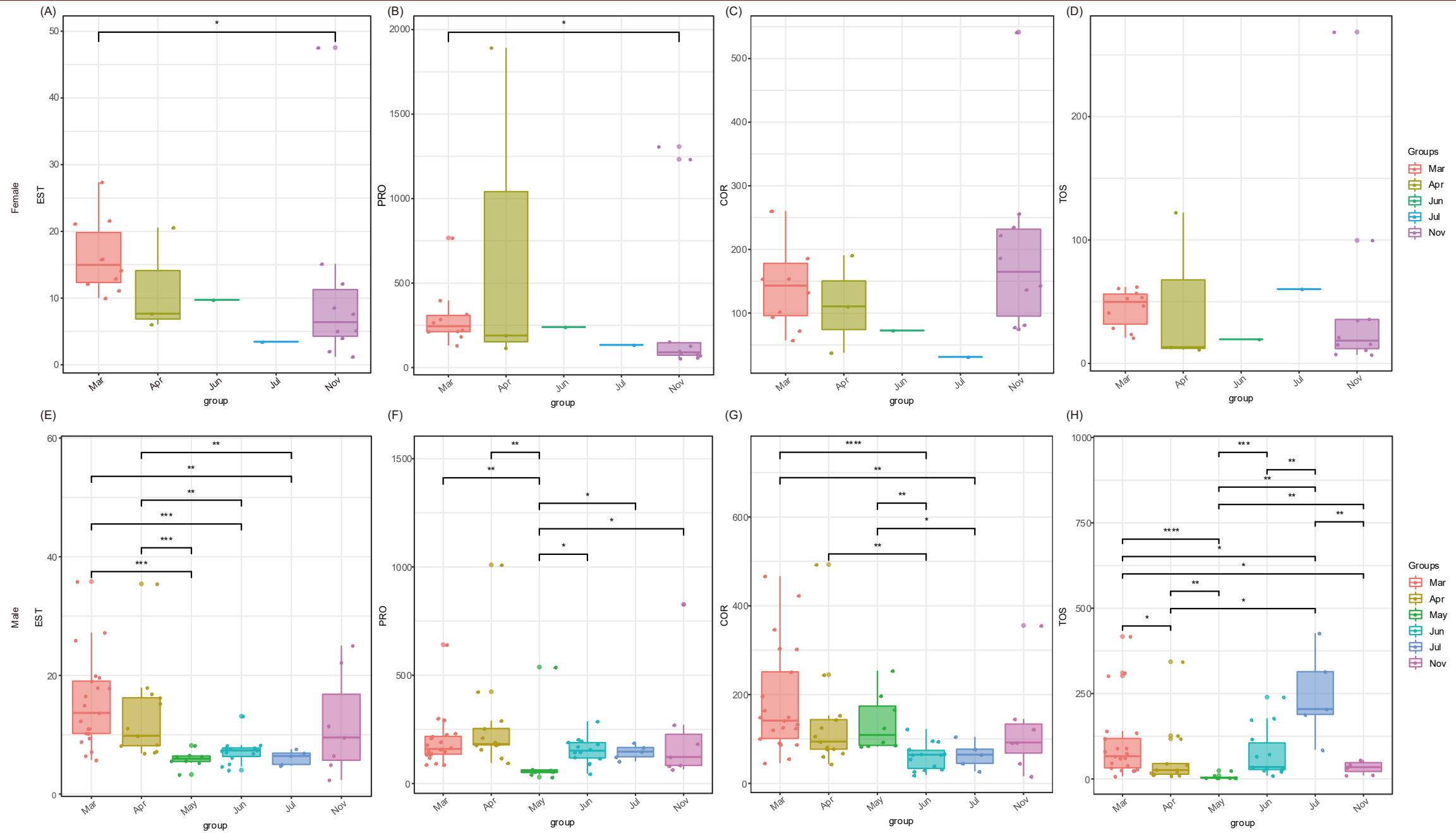


结果2：肠道微生物的季节性变化及性别差异





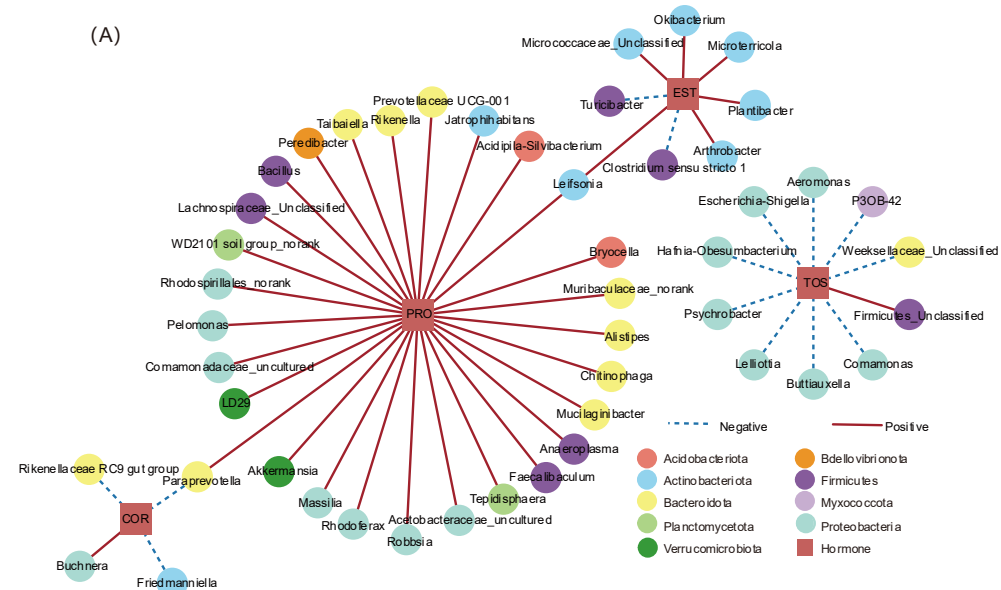
结果3：大熊猫激素的季节性动态变化



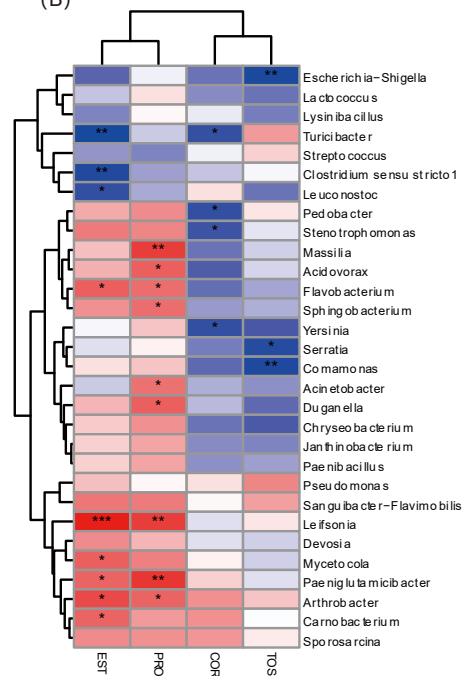


结果4：大熊猫显著的微生物群-内分泌耦合现象

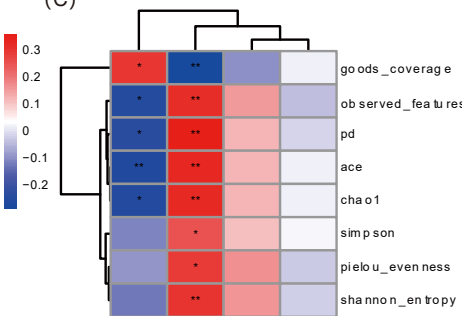
(A)



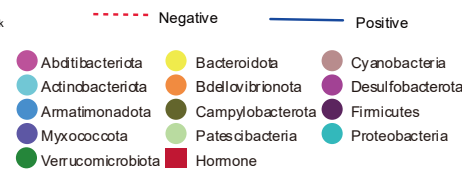
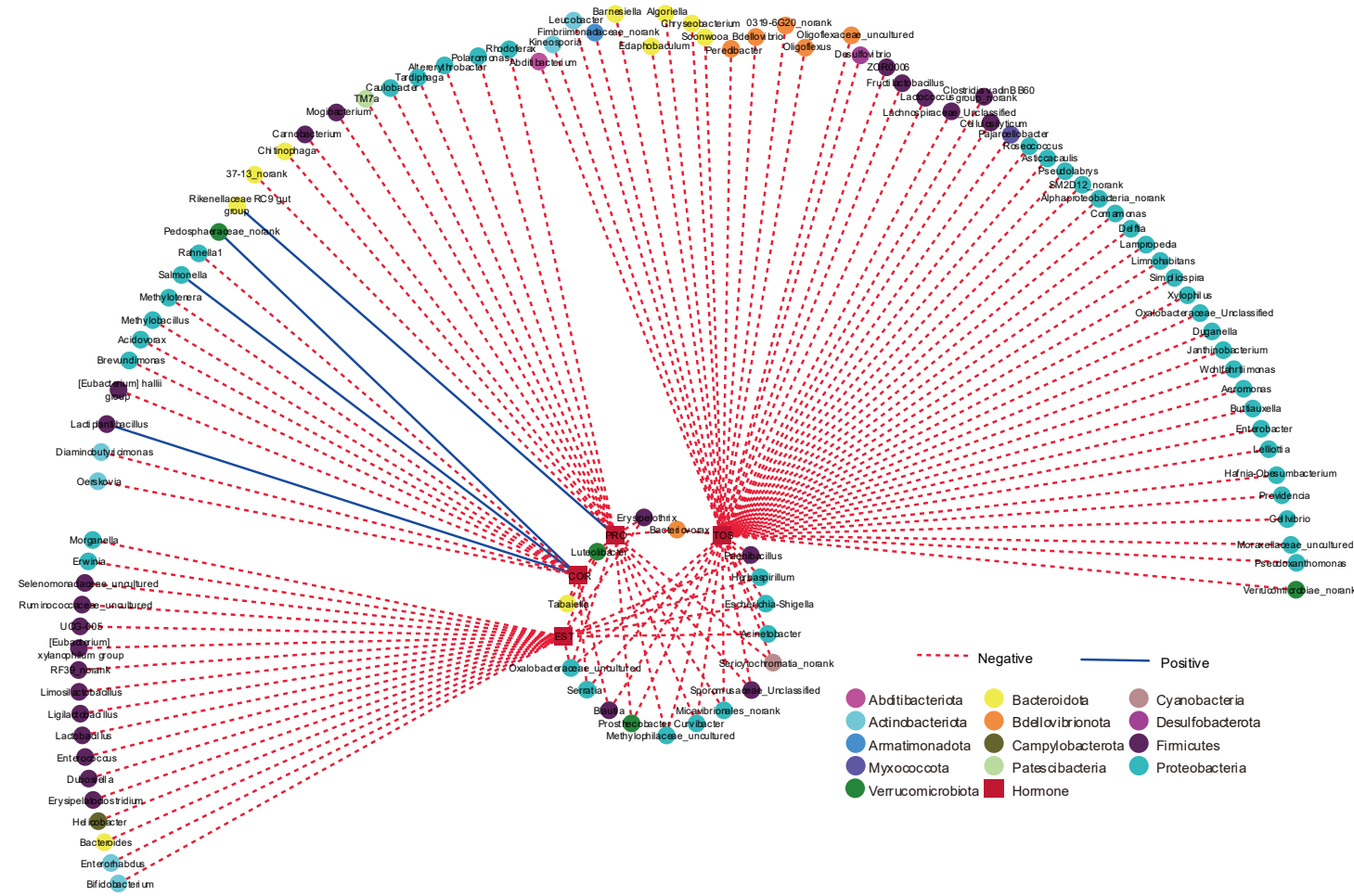
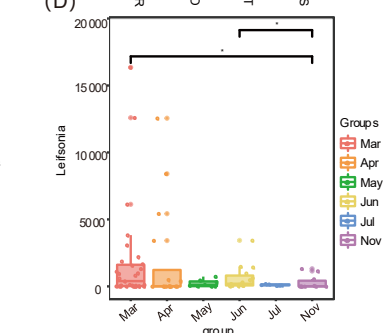
(B)



(C)

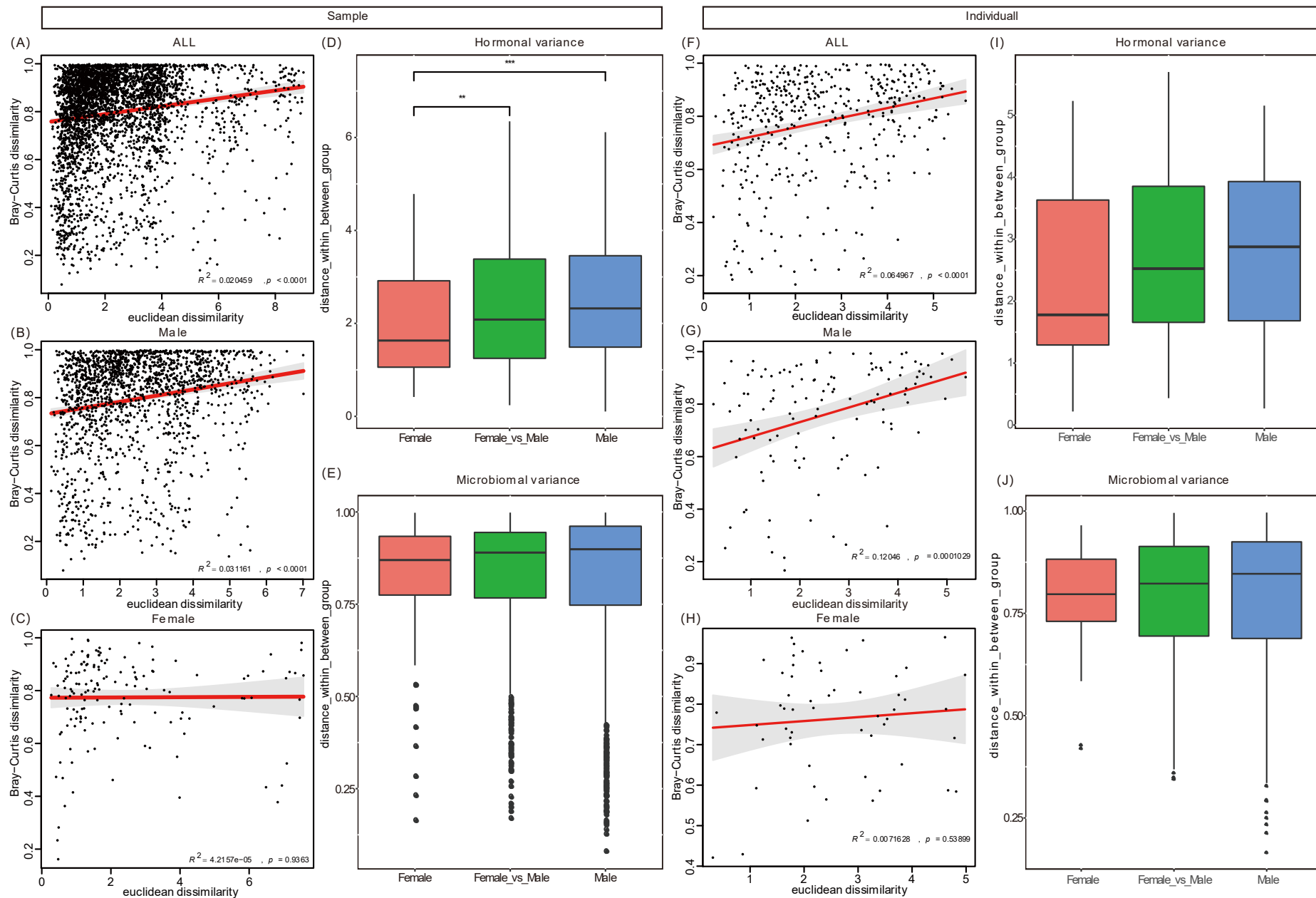


(D)





结果5：雄性大熊猫显著的微生物群-内分泌耦合现象





总结

- ❑ 大熊猫肠道微生物组成在季节变化和两性之间均存在差异
- ❑ 大熊猫激素水平表现出对生殖活动和代谢状态的适应性调节
- ❑ 大熊猫肠道微生物和激素之间存在关联，且这种关联在雄性中显著，雌性中不显著

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