

## Supporting Information

### **A Multifunctional Collagen-Base Bilayer Membrane integrated with Bimetallic/Polydopamine Network for Enhanced Guided Bone Regeneration**

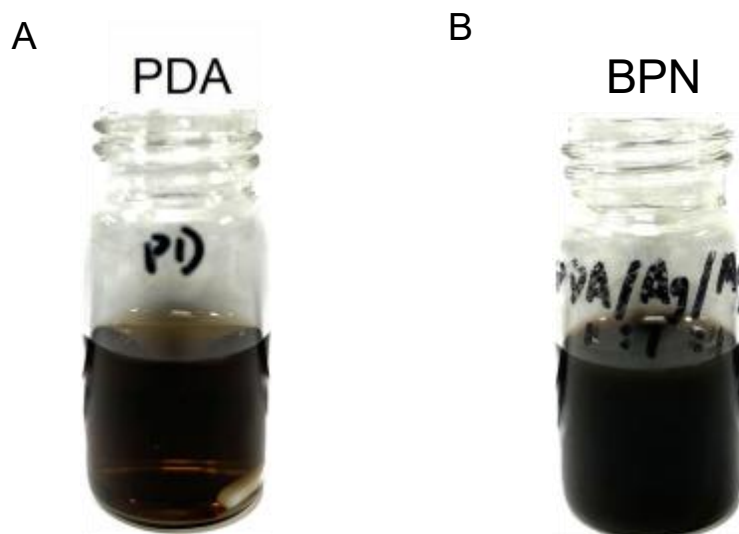
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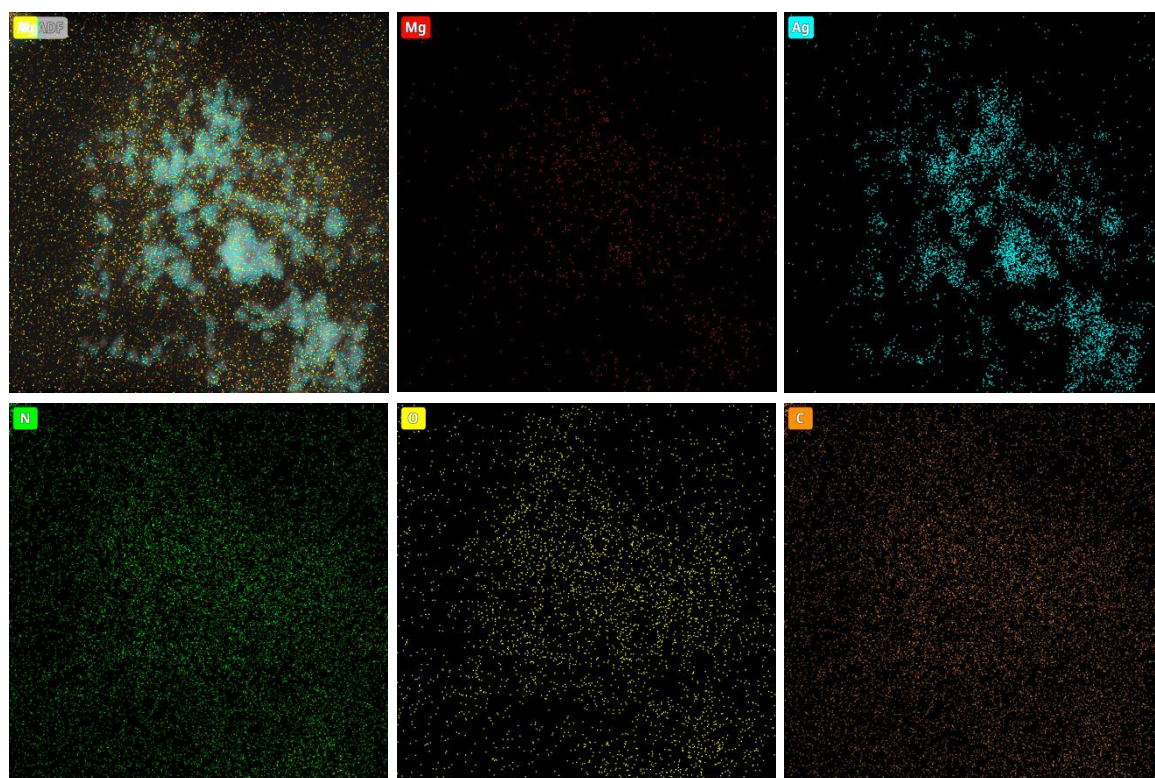
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**Fig S1.** Photographs of the A) PDA solution and B) BPN solution.



**Fig S2.** EDS images of BPN.

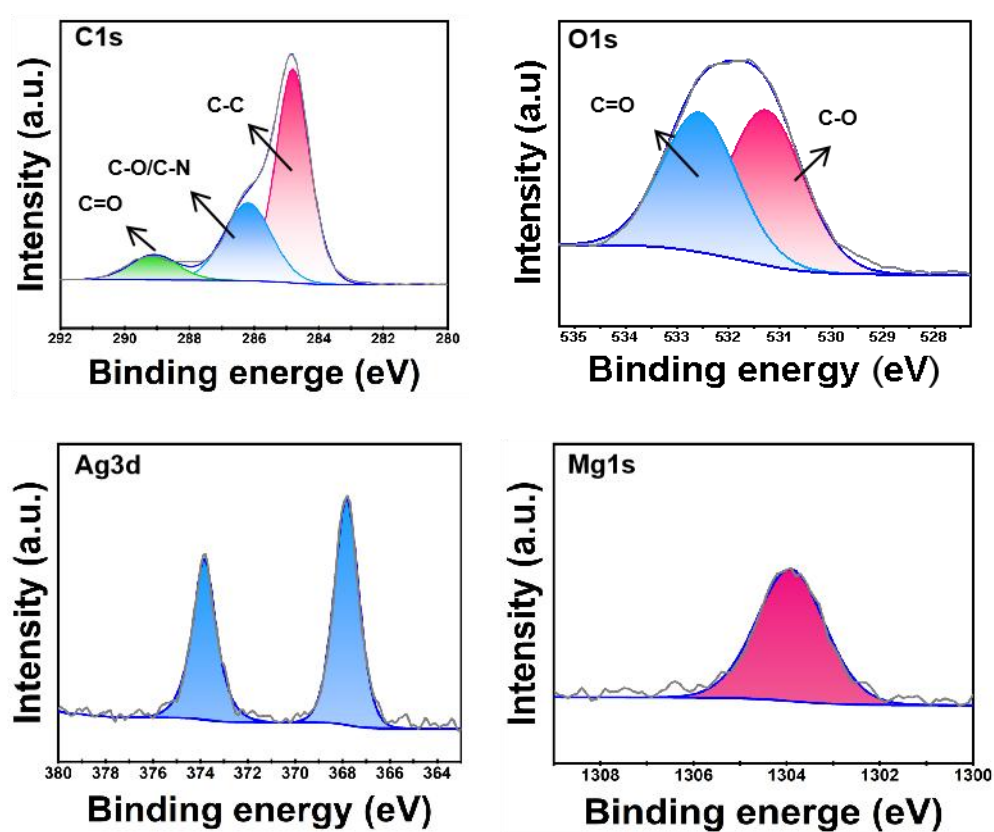


Fig S3. High-resolution XPS spectra of C1s, O1s, Ag 3d and Mg1s of BPN.

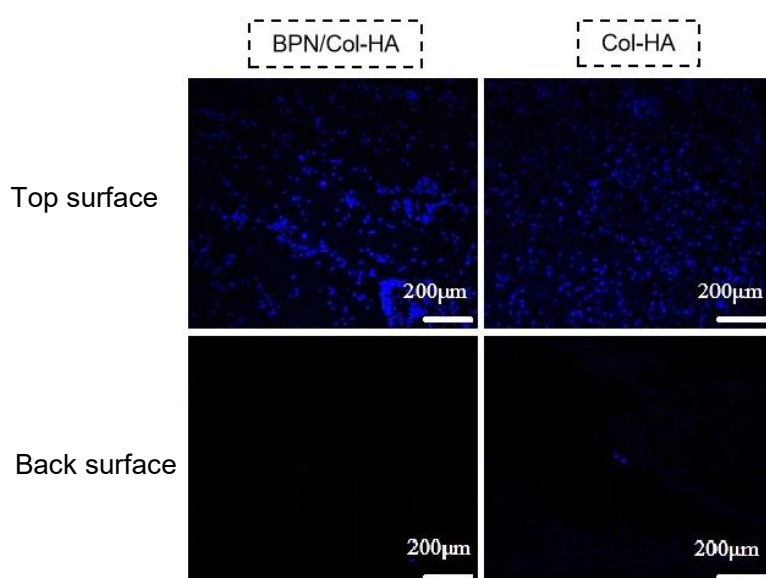


Fig S4. DAPI staining of cells on the top and back surfaces of BPN/Col-HA membranes and Col-HA membranes.



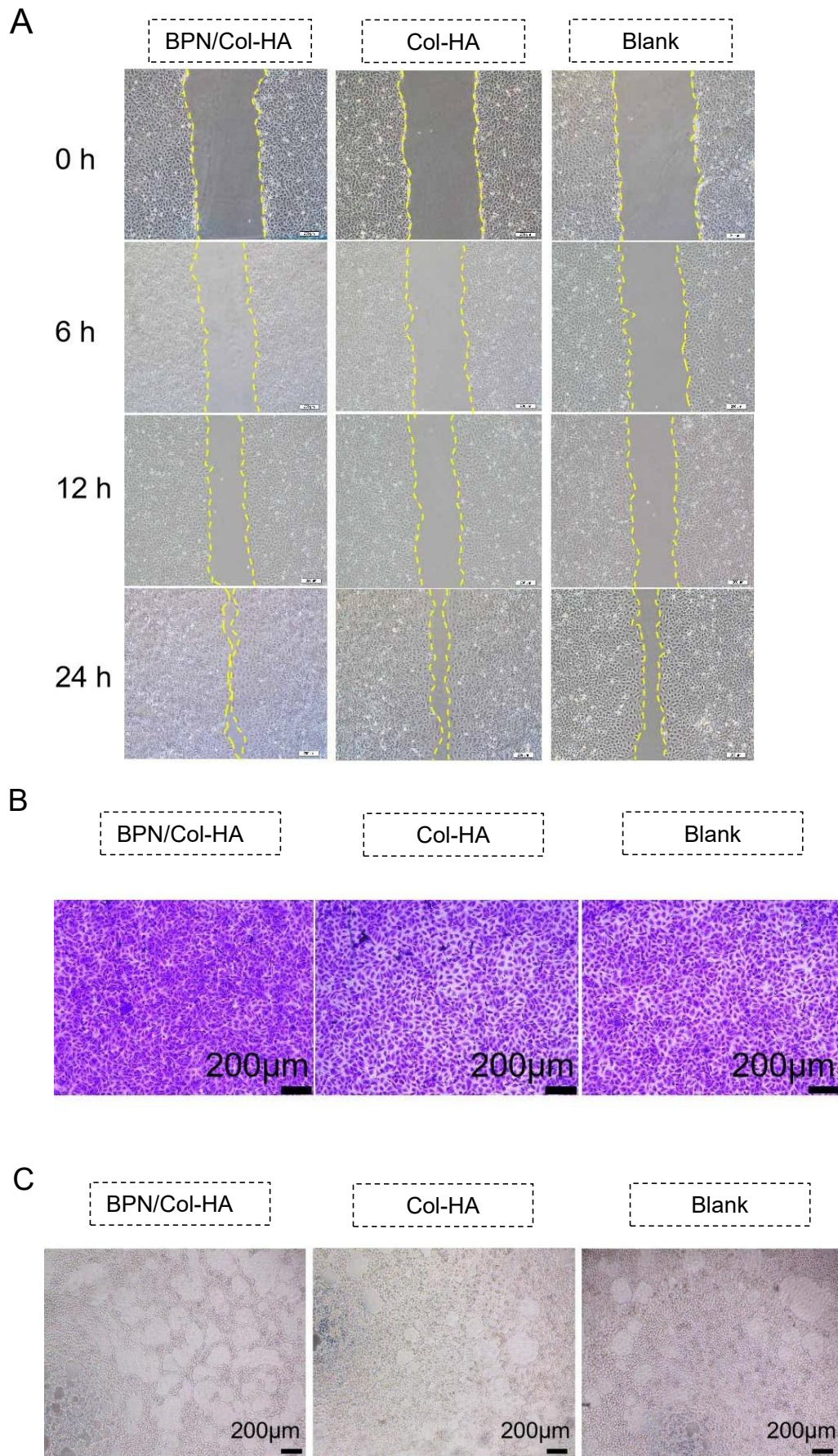


Fig S5. Angiogenesis experiments. A) cell migration area in wound healing assay; B) cell crystal violet staining in chemotaxis assay; C) tube formation assay.

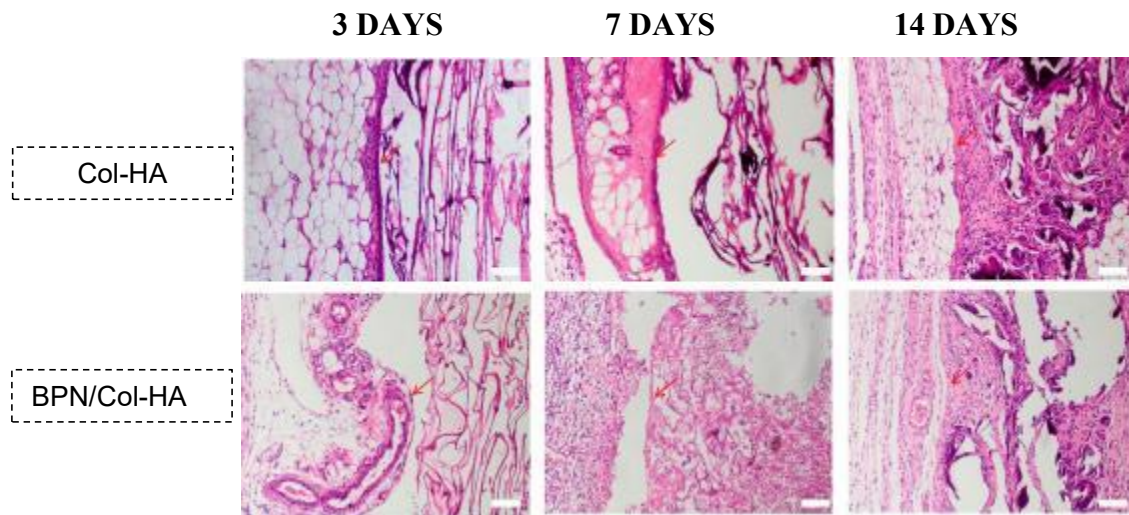


Fig S6. H&E stained sections of rat skin with Col-HA and BPN/Col-HA membrane in subcutaneous implantation model (bar=200 $\mu$ m). Arrows indicate fibrous layers.



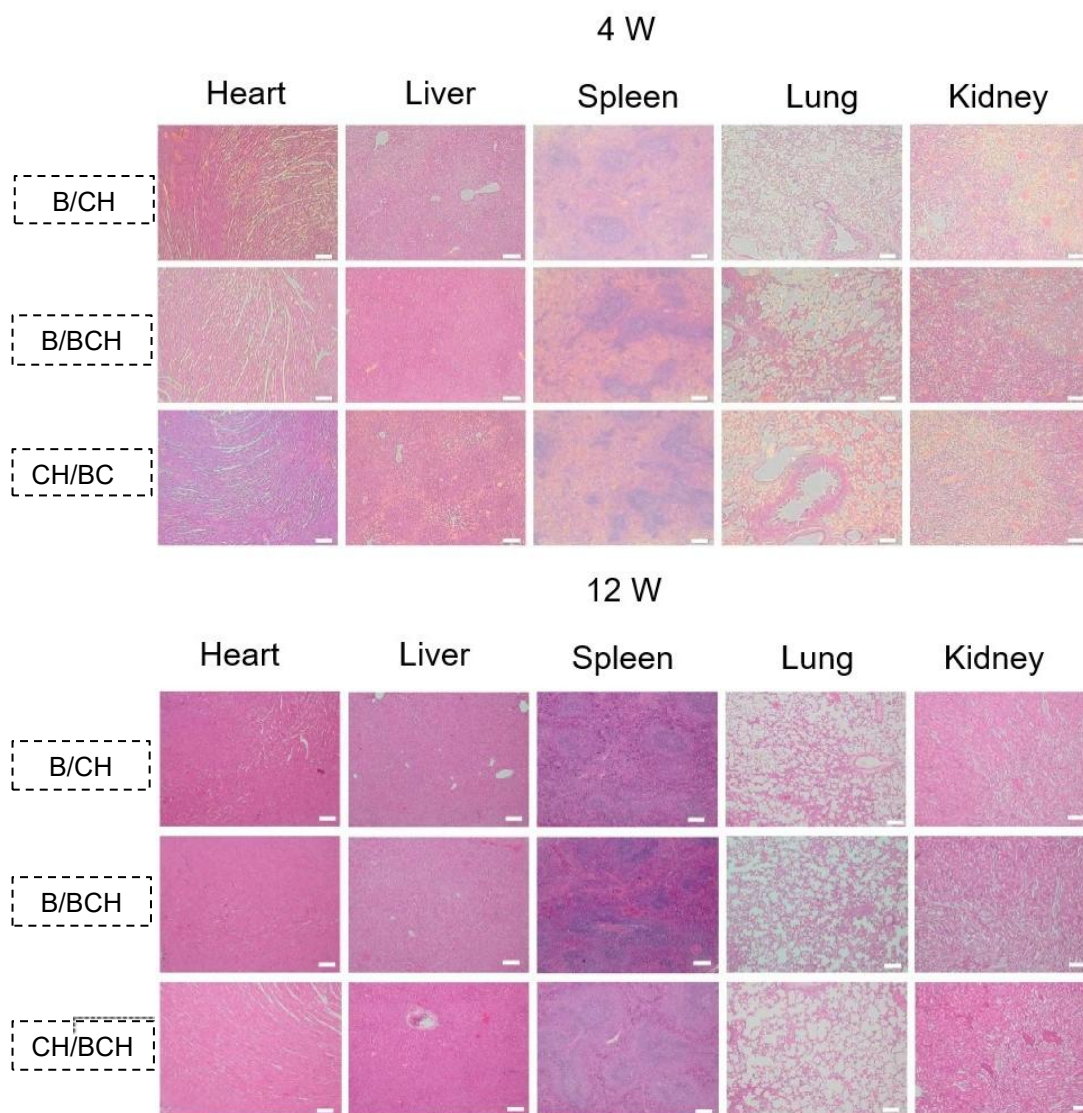


Fig S7. H&E sections of the heart, liver, spleen, lung, and kidney after 4 and 12 weeks post-surgery in rat cranial defect models (bar=200 $\mu$ m). B: blank control; CH: Col-HA; BCH: BPN/Col-HA.

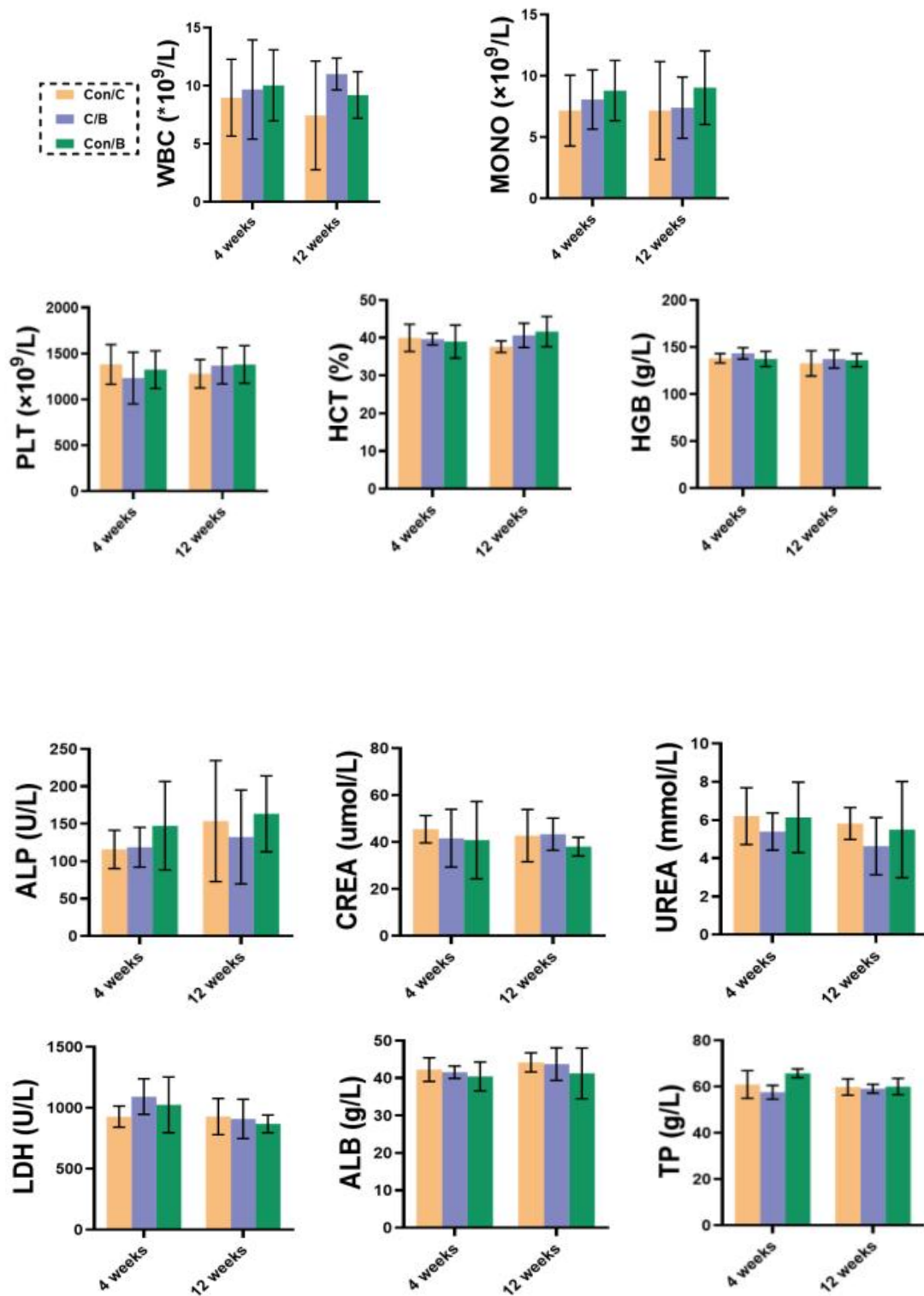


Fig S8. Hematologic parameters after 4 and 12 weeks post-surgery in rat cranial defect models. Con, Control; C, Col-HA; B, BPN/Col-HA.