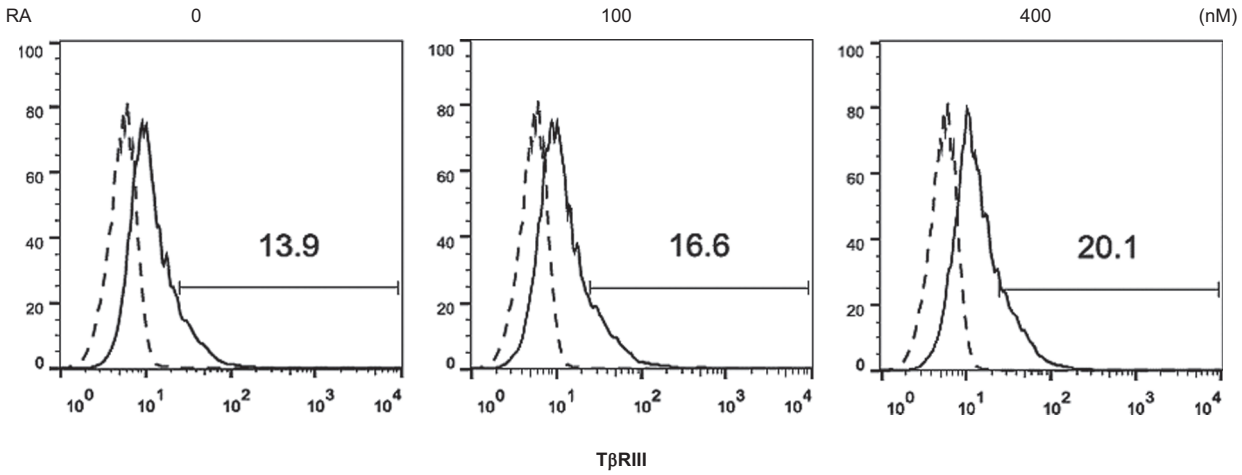
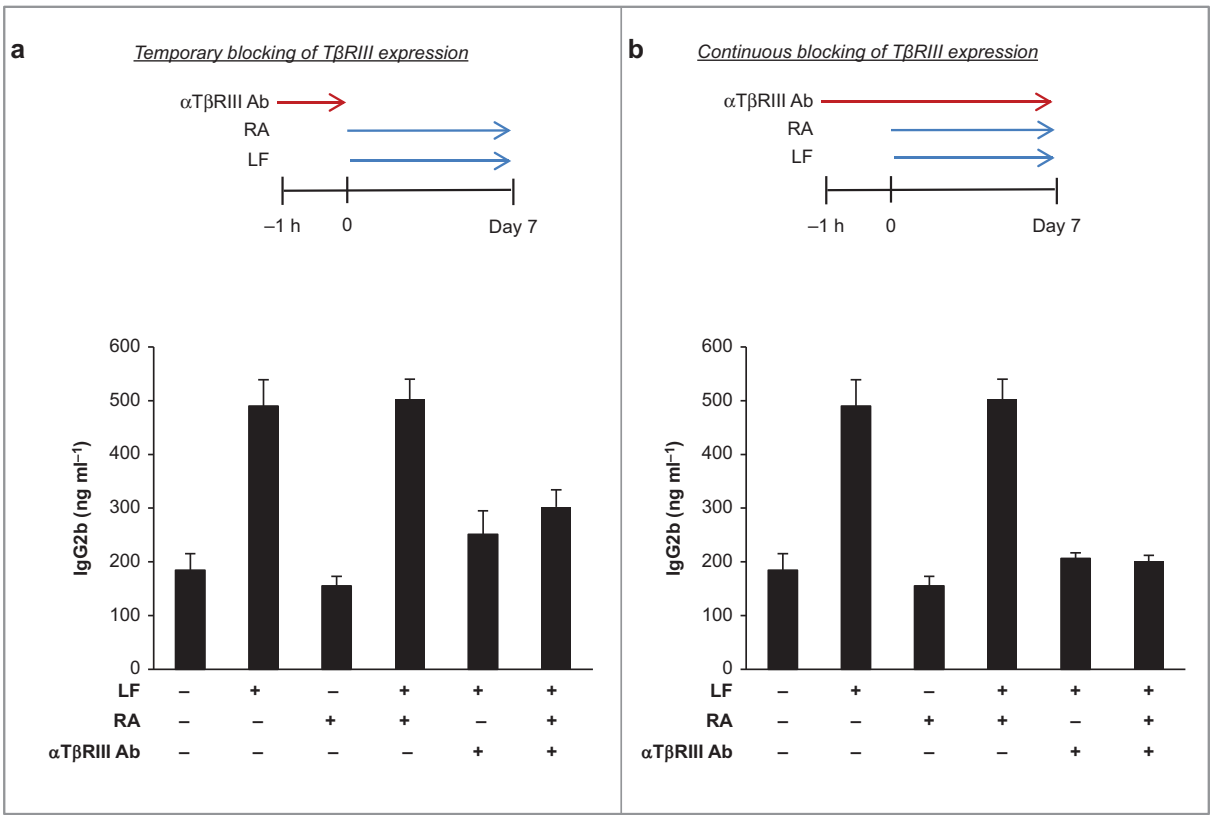
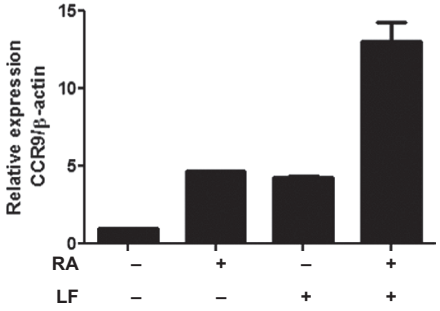


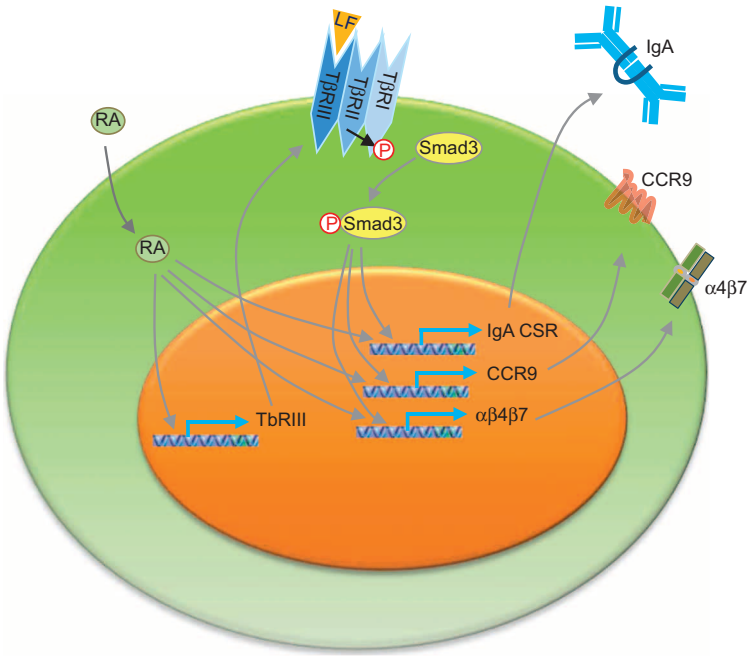
Supplementary Figure 1 Effect of RA on the expression of surface betaglycan (TβRIII). Normal spleen B cells were cultured with LPS (12.5 μg ml^{-1}) and RA (100, 400 nM). After 4 days of culture, surface betaglycan expression was analyzed by FACS. RA, retinoic acid.



Supplementary Figure 2 Effect of anti-TβRIII Ab treatment on IgG2b production by LF and RA. Normal spleen B cells were cultured with LPS (12.5 μg ml^{-1}), LF (120 μg ml^{-1}), and RA (100 nM). Anti-TβRIII Ab (5 μg ml^{-1}) was added for the periods as indicated in panels **a** and **b**. After 7 days of culture, level of IgG2b was determined by ELISA. LF, lactoferrin; RA, retinoic acid.



Supplementary Figure 3 LF and RA synergize to induce expression of CCR9. Normal spleen B cells were cultured with LPS (12.5 μg ml^{-1}), LF (60 μg ml^{-1}), and RA (25 nM). After 3 days of culture, total RNA was isolated, and levels of CCR9 were measured by q-PCR. LF, lactoferrin; RA, retinoic acid.



Supplementary Figure 4 Possible mechanisms by which LF and RA synergize to enhance overall gut IgA immunity. LF increases expression of IgA, CCR9, and α4β7 through TβRIII binding and activating canonical TGF-β signaling. Meanwhile, it is highly plausible that RA increases not only the expression of these target genes through RAR directly but also enhances LF-mediated IgA/CCR9/α4β7 expression through the induction of TβRIII indirectly. LF, lactoferrin; RA, retinoic acid.