Supplemental Figure 1. The metabolism and function of vitamin A in antigen presenting cells. The antigen presenting cell (APC) expresses STRA6, which binds RBP and allows the APC to acquire retinol. The APC expresses retinaldehyde dehydrogenase (RALDH) 2 for the metabolism of retinol to all-trans retinoic acid (atRA). Secreted atRA, synthesized by the APC, acts on CD4+ T lymphocytes to induce a regulatory T cell phenotype (iTreg) and stimulates isotype class switching to immunoglobulin A (IgA) by B lymphocytes. In addition both B and T lymphocytes up-regulate CCR9 and α4β7 in response to atRA, leading to the homing to gut mucosa. Synthesized atRA up-regulates transcription of matrix metalloproteinase-9 (MMP-9) and CD1d by the APC. CD1d presents lipid antigens such as α-galactosylceramide (α-GalCer) to invariant natural killer T (iNKT) cells causing their proliferation. The secretion and activation of MMP-9 degrades gelatin, types I and IV collagen, and laminin in the extracellular matrix.