induced decrease in DRA mRNA (50%, $P < 0.05$) and protein (40%, $P < 0.05$) was also markedly alleviated by ATRA. Further, ATRA significantly blocked the inhibitory effects of IFN-γ on DRA promoter activity. To evaluate if ATRA exerted these effects through modulation of IFN-γ induced signaling cascade, signal transducer and activator of transcription factor-1 (STAT-1) phosphorylation levels were analyzed. IFN-γ treatment induced the activation of STAT-1, however, ATRA co-treatment significantly diminished IFN-γ induced STAT-1 phosphorylation. In DSS- colitis, mouse model, ATRA treatment attenuated the reduced expression of DRA mRNA and protein levels in distal colon of DSS-mice. Further, the enhanced expression of inflammatory cytokines IL-1β (~10 fold) and CXCl1 (~18 fold) induced by DSS was also alleviated by ATRA treatment.

Conclusions: These data indicate that ATRA increases DRA function and expression under inflammatory conditions and this could serve as a novel therapeutic approach in IBD associated diarrhea.

(Work also presented at Digestive Disease Week, May 2014, in Chicago, IL, USA)

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Toll-like receptor 9 activation affects intestinal serotonin transporter activity and expression in CACO-2-cells

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Background: Toll-like Receptor 9 (TLR9) is expressed mainly in the endosomal membrane of intestinal cells and mediates intestinal host-microbiota interaction. Serotonin (5-HT) is an intestinal neuromodulator involved in the intestinal immunity and homeostasis. In addition, a high level of 5-HT has been described in intestinal inflammation. 5-HT intestinal availability is mainly regulated by the serotonin transporter (SERT) expressed in enterocytes.

Aim: The interaction of TLR9 with serotoninergic system remains known. Therefore, the aim of the present study was to assess the effects of TLR9 activation on SERT activity and expression.

Methods: Caco-2 cells and colon from wild type (WT) and TLR9$^{-/-}$ C57BL/10 mice were used in this study. SERT activity (5-HT uptake) in Caco-2 cells and SERT expression (RT-qPCR and western blotting) in both Caco-2 cells and colon from WT and TLR9$^{-/-}$ mice, were analyzed. TLR9 mRNA and protein levels were also measured in Caco-2 cells.

Results: TLR9 activation in Caco-2 cells reduced SERT activity in a MyD88 independent-way. SERT mRNA and protein level in both cell lysate and brush border membrane, were also diminished. SERT protein expression in colon of TLR9$^{-/-}$ mice resulted augmented compared with WT mice. Interestingly, activation of TLR9 in Caco-2 cells diminished TLR9 mRNA and protein in the cell lysate; however, TLR9 protein in brush border resulted increased.

Conclusions: The results of this work highlight the role of TLR9 as a mediator intestinal homeostasis and/or intestinal inflammation by regulating intestinal serotoninergic system.

This work was funded by grants from the Spanish Ministry of Science and Innovation and ERDF/FEDER (BFU2009-08149; BFU2010-18971), the Aragon Regional Government and ESF (B61) and the Foundation for the Study of IBD in Aragón (ARAINF 012/2008). E. Layunta and E. Latorre are fellowship recipients from Aragon Regional Government (B022/13; B105/11).

[The name of the third author was corrected 13 July 2015, following initial online publication].

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Mucosal alterations and increased intetsinal permeability in a murine model of multiple sclerosis

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Background: Multiple sclerosis (MS) is an immune-mediated demyelinating and neurodegenerative disease of the central nervous system with a disrupted blood-brain barrier. Since there is an association between MS and inflammatory bowel disease, and a critical role of the gut microbiota in the latter entity has recently been suggested, we wanted to test the hypothesis that the intestinal barrier is also targeted in MS.

Aim: We aimed to investigate whether intestinal permeability is affected during the progression of Experimental autoimmune encephalomyelitis (EAE), a well-known animal model of MS, and to examine if there is a disruption of mucosal immune homeostasis.

Methods: EAE was induced in C57BL/6 mice either by active immunization or adoptive transfer of autoreactive T-cells. The intestinal permeability was assessed *in vivo* to a small molecule (sodium fluorescein) and a macromolecular protein (FITC-BSA) marker, prior to the onset and at the stage of paralysis. The intestinal samples were analyzed for histological changes, tight junction regulator protein (zonulin), and inflammatory parameters.

