Gene Expression Profiling of Mouse Chitinase-Like Proteins

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Outline

Mice and humans produce chitinase-like proteins (CLPs), which are highly homologous to chitinases but lack chitinolytic activity. Mice express primarily three CLPs, including breast regression protein-39 (BRP-39) [chitinase 3-like-1 (Chi3l1) or 38-kDa glycoprotein (gp38k)], Ym1 (Chi3l3) and Ym2 (Chi3l4). Recently, CLPs have attracted considerable attention due to their increased expression in a number of pathological conditions, including asthma, allergies, rheumatoid arthritis and malignant tumors. Although the exact functions of CLPs are largely unknown, the significance of their increased expression levels during pathophysiological states needs to be determined. The quantification of BRP-39, Ym1 and Ym2 is an important step in gaining insight into the *in vivo* regulation of the CLPs.

We quantified and analyzed these CLPs mRNA levels with a quantitative real-time PCR assay using the single standard DNA. We found that BRP-39 and Ym1 were abundant in the mouse lung, whereas Ym2 mRNA was abundant in the stomach, followed by lung (Figure 1). The expression levels of BRP-39 and Ym1 in the mouse lung were higher than those of two active chitinases and were comparable to glyceraldehyde-3-phosphate dehydrogenase, a housekeeping gene which is constitutively expressed in all tissues (Figure 2).

Data are presented as mean ± SD of five samples. *p < 0.05; **p < 0.01.

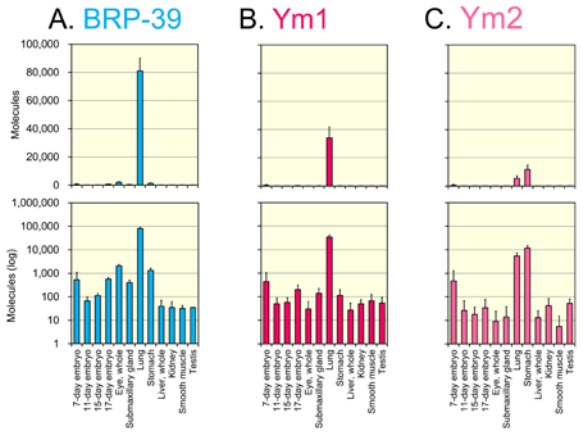

Figure 1. Expression of BRP-39, Ym1 and Ym2 mRNAs in mouse tissues.

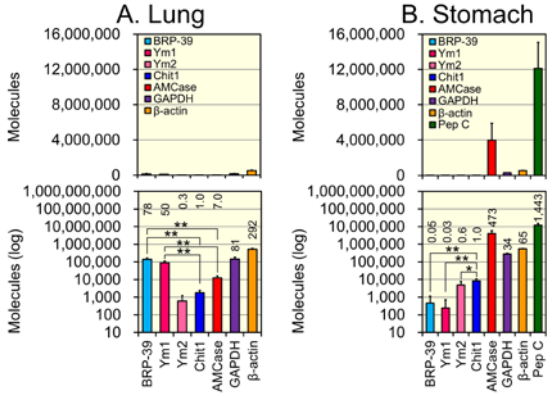

Figure 2. Analysis of eight genes mRNA in mouse lung and stomach.

Novelty

Our results indicate that catalytically inactive BRP-39 and Ym1 are constitutive genes in normal mouse lung (Figure 1 and 2).

Application

Using the quantification system described here, the CLPs mRNA levels can be compared with mammalian chitinases across mouse tissues using qPCR. This type of analysis can help to understand the biological function of CLPs, particularly in the pathophysiological studies using murine models.

Related information

●Original paper Ohno, M., Kida, Y., Sakaguchi, M., Sugahara, Y. and Oyama. F. (2012) Establishment of a quantitative PCR system for discriminating chitinase-like proteins: catalytically inactive breast regression protein-39 and Ym1 are constitutive genes in mouse lung. ***BMC Molecular Biology* 15:** 23.

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