

# Gene Expression Profiling of Mouse Chitinases

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## Outline

Chitinases hydrolyze the  $\beta$ -1-4 glycosidic bonds of chitin, a major structural component of fungi, crustaceans and insects. Although mammals do not produce chitin or its synthase, they express two active chitinases, chitotriosidase (Chit1) and acidic mammalian chitinase (AMCase). These mammalian chitinases have attracted considerable attention due to their increased expression in individuals with a number of pathological conditions, including Gaucher disease, Alzheimer's disease and asthma. However, the contribution of these enzymes to the pathophysiology of these diseases remains to be determined.

The quantification of the Chit1 and AMCase mRNA levels can generate useful and biomedically relevant information. We quantified and analyzed these chitinases mRNA levels with a quantitative real-time PCR assay using the single standard DNA. We found that AMCase mRNA is synthesized at extraordinarily high levels in the mouse stomach (Figure 1). The level of this mRNA in the mouse stomach was 7- to 10-fold higher than the levels of the housekeeping genes and was comparable to that the level of the mRNA for pepsinogen C (progastricsin), a major component of the gastric mucosa (Figure 2).

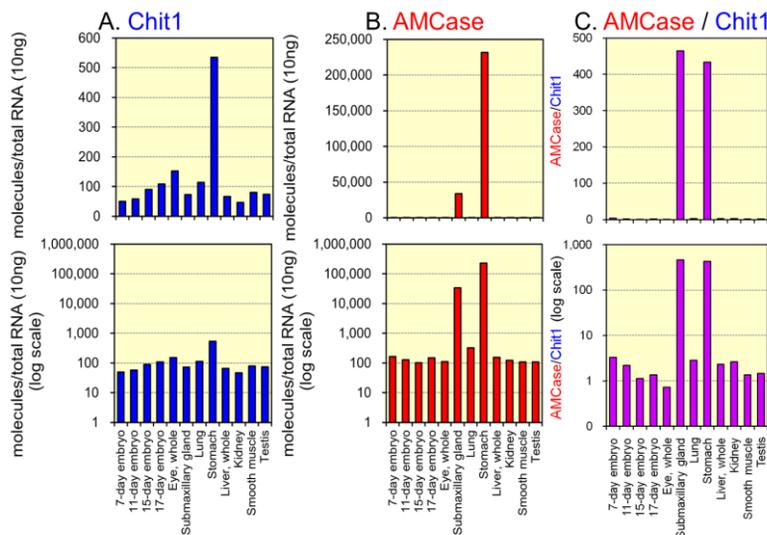


Figure 1. Expression of Chit1 and AMCase mRNAs in mouse tissues.

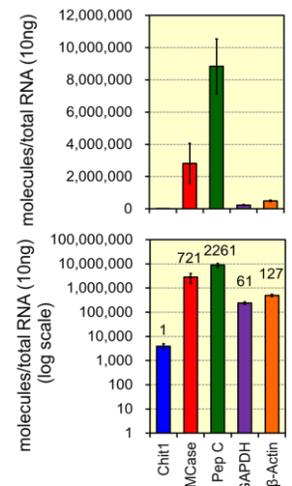


Figure 2. Analysis of five genes mRNA in mouse stomach.

## Novelty

Our results indicate that AMCase mRNA is a major transcript in mouse stomach (Figures 1, 2). AMCase can function as a digestive enzyme that breaks down polymeric chitin.

## Application

Chit1 and AMCase have been reported that their increased expression in individuals with a number of pathological conditions. These data could give insights into pathogenic mechanism and the innate immune mechanism.

## Related information

- Original paper Ohno, M., Tsuda, K., Sakaguchi, M., Sugahara, Y. and Oyama, F. (2012) Chitinase mRNA levels by quantitative PCR using the single standard DNA: acidic mammalian chitinase is a major transcript in the mouse stomach. *PLoS ONE* 7: e50381.
- URL <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0050381>