Reviewer's report

Title: Multiple proteins and biological processes up-regulated during maxillary expansion in rats

Version: 1 Date: 16 September 2007

Reviewer: Tara L Aghaloo

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Major Compulsory Revisions

In the abstract, background section, the authors state that maxillary expansion (ME) is an accepted practice …, but “its treatment effect needs improvement.” This statement should be clarified, as to what type of improvement is needed, and how is a rat study on the molecular mechanisms going to answer these questions or issues.

In the background section, much more information is needed. More should be written about proteomics and disease understanding using proteomics. More about tissue remodeling should be written, and how this pertains to the current study. The authors state that “the biological mechanism of ME is so complicated.” They must elaborate more on the complexity, and how proteomics will help make this less complicated. Also, how does proteomic understanding relate to further interpretation of the procedure, because the authors state that a “global proteomic understanding is needed to interpret further the procedure.”

The results in general, need much more explanation and detail. In the histological alterations subsection, the authors say “significant tissue remodeling.” Much more information is needed here, with detailed histological description. In the PCNA and collagen I expression subsection, “to identify the tissue in the suture shown in Fig 2F of the ME group, immunohistochemical analysis of collagen I … “ is not nearly descriptive enough for a result in this paper. Please clarify this significantly. In the western blot subsection, figures 7 and 8 should be combined into one figure and error bars should be used in the quantitation.

The discussion first sentence “rats were used in the present study for practical reasons…” does not fit here in this paper. This should be placed in the body of the discussion. Also, much more expansion on the rat models of ME should be discussed here. Why does proteomics apply here? Why is it necessary in this model? Please describe more in detail about this point. Much of the discussion focuses on processes such as UPR and stress reaction, angiogenesis, cell proliferation, and reconstruction of cytoskeleton. However, the authors did not focus on any of these processes with the experiments in this study. They only focused on bone tissue remodeling proteins, so why is all of this discussion here? The osteogenesis subsection should be expanded, including why these proteins are differentially expressed. Elaborate more on OPG, PTH, and vimentin.
Are the weights significantly different in figure 1? Figure 2, 3, and 4 need to be labeled, and as stated previously, figures 7 and 8 should be combined.

Minor Compulsory Revisions

The methods section should elaborate on the expansion procedure including rate, frequency, amount of expansion, etc. In the 2-DE section, it is stated, “based on the daily body weight monitoring and histological observations, rats at 3d were chosen for proteomic analysis of the midpalatal sutures.” How was this time point chosen as an important point for evaluation? This is not clear.

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.