INTRODUCTION:
When the patient has symptomatic rotator cuff tear, the subacromial bursal tissue shows the inflammatory and healing response for the lesion \(^1\). Uhthoff and Trudel \(^4\) stated the regenerative function of the subacromial bursal tissues.

Since, tissue regenerative medicine is very attractive technique and this study attempted the isolation, proliferation and characterization of osteogenic, adipogenic and neurogenic cells from subacromial bursal tissues.

METHODS:
The 5mm x 5mm sized samples of subacromial bursal specimens from 39 patients undergoing surgery for rotator cuff tearing (n = 21), the proximal humeral fractures (n = 14), and calcific tendinitis (n = 4) were studied to characterize and isolate multipotent colonies from the tissues. The Subacromial bursal tissue-derived colonies were cultured in DMEM or MSCGM. In passaged number 4 to 8, cultured fibroblast-like cells were harvested and marked with following antibodies of CD13, CD14, CD29, CD31, CD34, CD44, CD45, CD73 (SH3), CD90, CD105 (SH2) and HLA class I, and HLA-DR by using flowcytometry.

Informed consent was obtained from the subjects, and the study protocol was approved by the institutional review board of Chosun University Hospital, Korea.

RESULTS
Human subacromial bursal tissue-derived colonies were highly proliferative and immunophenotypically positive for CD13, CD29, CD44, CD54, CD73 (SH3), CD90, CD105 (SH2) and HLA class I, but negative for CD14, CD31, CD34, CD45 and HLA-DR(Figure 1).

Incubation of these fibroblast-like cells with osteogenic agents revealed positive von Kossa staining in 32 cases(Figure 2). All the cases show positive adipogenic(Figure 3) and neurogenic potential.

DISCUSSION:
The debridement of subacromial tissue during rotator cuff surgery is common procedure for symptomatic relief, since it is inflammatory and adhesive tissue. Previous studies showed healing and differential potentials of subacromial bursal tissue \(^2\), but no report is available for the stem cell differentiation.

In our study, the cells derived from subacromial bursal tissue were evaluated by immunophenotypic assay and its differentiation. We could confirm the potentiality of the subacromial derived fibroblast-like cells to be differentiated into neuron, bone and adipose tissues. Surface antigens in the subacromial bursal tissue-derived stem cells were evaluated by using the flow cytometric analysis for the expression of positive markers of CD29, CD44, CD90/Thy-1 and CD105/SH2. These finding are similar to positive marker of bone marrow-derived mesenchymal stem cells.

Our study successively isolated, characterized and proved differential potentiality of human subacromial bursal cells.

Since human subacromial bursal cells are broadly potential, the cells could be differentiated into cells of adipogenic, osteogenic, neuronal lineages. From these aspects, the subacromial bursal tissue-derived stem cell could be suggested as sources for cell therapeutics for musculoskeletal degenerative diseases and injuries.

In conclusion, our finding may lay the groundwork for the future therapy of many degenerative lesion, particularly major rotator cuff tears or ligament injuries of shoulder from the subacromial bursal cells.

REFERENCES: