Scientific Brief:
Mesenchymal Stem Cells (MSC)

- Adipocyte
- Osteoblast
- Myoblast
- … and others
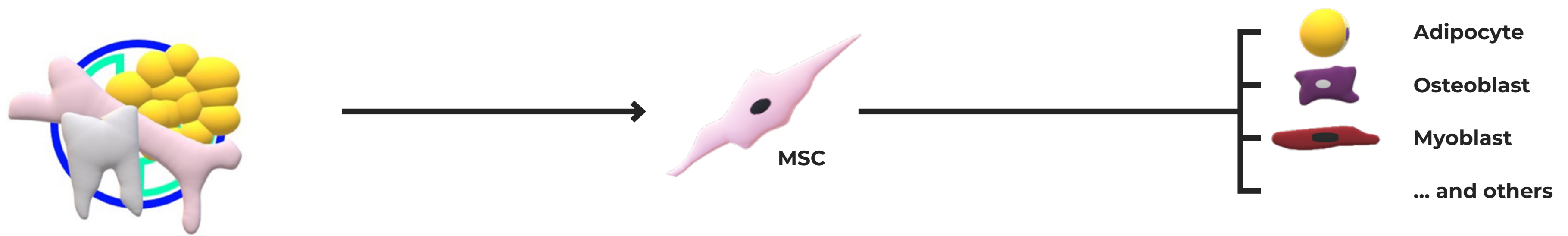
MSC

Mesenchymal stem cells (MSC) are present in various tissues, including bone marrow, umbilical cord, and adipose tissue. MSC are multipotent, self-renewing cells characterized by their plastic adherence and ability to differentiate into cell types of bone, cartilage, fat, and other tissues. They express specific marker proteins, which vary depending on their tissue of origin. For example, adipose tissue-derived MSC (AT-MSC) commonly express CD90, CD73, and CD105, while they lack expression of CD34, CD45, HLA-DR, CD14 and CD11.

MSC can differentiate not only into their native lineages, such as adipocytes and osteocytes, but also into neurons, muscle cells, and other cell types. Their remarkable plasticity and regenerative potential make MSC a promising tool for advancing regenerative medicine and developing novel therapeutic approaches.

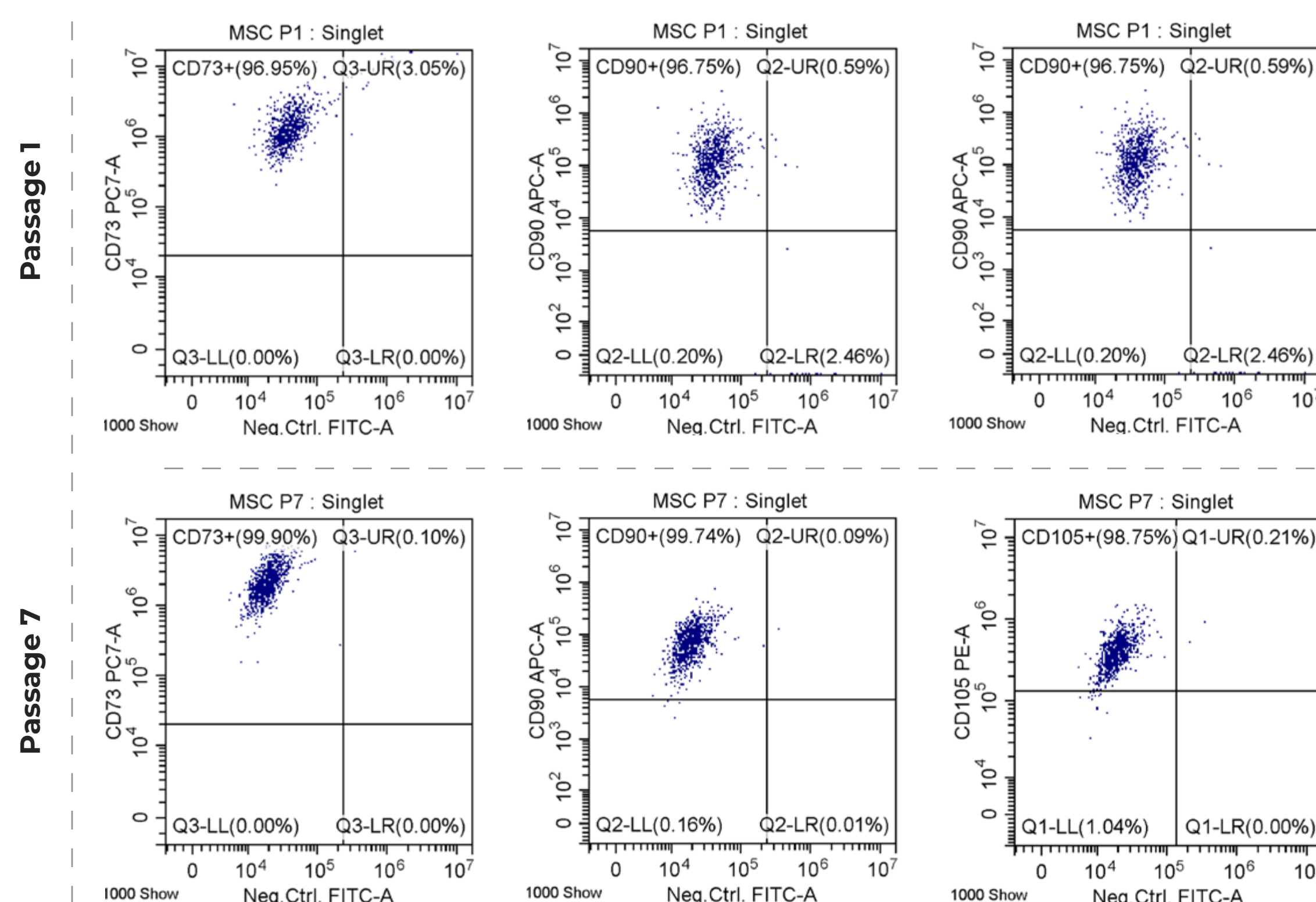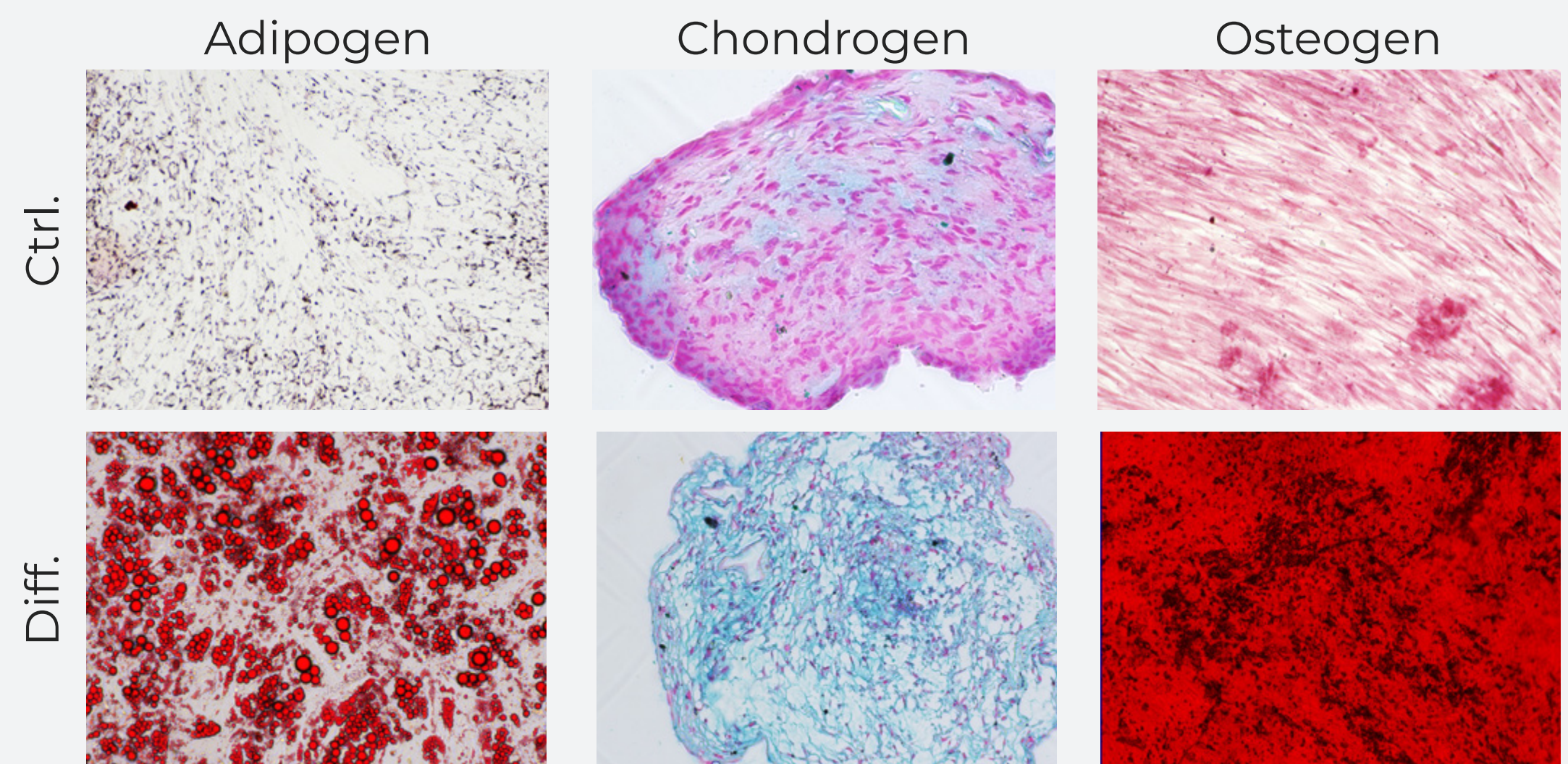## 2D Culture of Adipose Tissue-Derived Mesenchymal Stem Cells (AT-MSC)
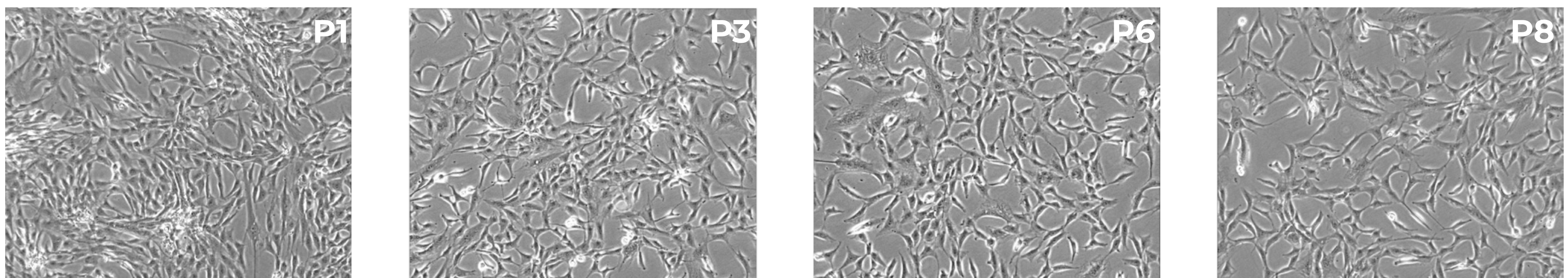
Adipose tissue-derived mesenchymal stem cell (AT-MSC) cultures:
AT-MSCs were cultured and expanded for several weeks in a 2D monolayer. 2D images were captured at different passages (P1 to P8).

Differentiation of AT-MSC

Trilineage differentiation of human mesenchymal stem cells (MSC) into adipocytes (left), chondrocytes (middle), and osteocytes (right). MSC were cultured either in standard MSC growth medium as a control (Ctrl.) or in specific differentiation media (Diff.). Differentiated samples were stained with Oil Red O for adipogenesis, Nuclear Fast Red and Alcian Blue for chondrogenesis, and Alizarin Red for osteogenesis.

Adipogen   Chondrogen   Osteogen
Ctrl.
Diff.

Characterization of AT-MSC by Flow Cytometry

Passage 1
Passage 7

Flow cytometry analysis was performed to assess the expression of key surface markers in adipose tissue-derived mesenchymal stem cells (AT-MSC) at passage 1 (upper pictures) or after passage 7 (lower pictures).

The measured markers included CD73, CD90, and CD105 as positive markers, while the negative markers — CD11, CD14, CD34, CD45 and HLA-DR — were included in the negative control cocktail (Neg Ctrl-FITC).