Developmental origin, functional maintenance and genetic rescue of osteoclasts.

Jacome-Galarza CE, Percin GI, Muller JT, Mass E ... Loyher PL, Karsenty G, Waskow C, Geissmann F.
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This study provides new data on the origin and maintenance of osteoclasts in the mouse. Besides showing that during bone development, osteoclasts derive from the embryonic erythro-myeloid progenitor lineage of resident macrophages, it demonstrates that osteoclast syncytia have a long lifespan and are maintained throughout life by the iterative fusion with individual hematopoietic stem cell (HSC)-derived monocytic cells. As discussed by the authors, these results may be important for the development of a new therapeutic strategy (transfusion of monocytic cells in place of HSC transplantation for rescue of early-onset osteopetrosis or, more in general, for gene transfer in osteoclasts) for bone diseases with absent/reduced osteoclast function. In addition, they have interesting implications for some pathological conditions associated with abnormal osteoclast syncytia. For example, it may be assumed that the frequency of fusion events is critical for the maintenance of a normal nucleus number in the long lived osteoclast. Therefore, assessing and controlling the mechanisms that regulate it may help to prevent the formation of hypernucleated (giant) osteoclasts that are associated with some high turn-over bone diseases.

Disclosures
None declared