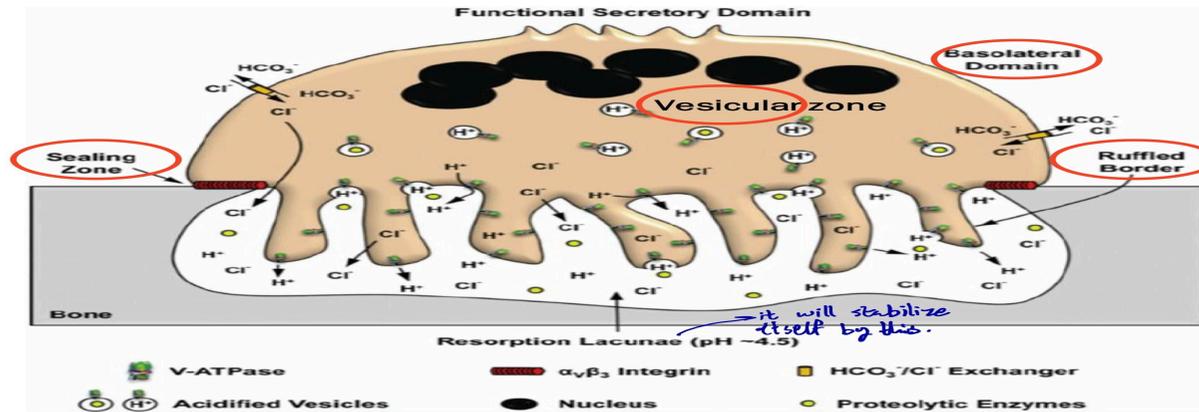


Bone cells	origin	site	features	function
<b>osteogenic (stem cells)</b>	mesenchymal cells	osteogenic layer of periosteum and endosteum.	<ul style="list-style-type: none"> <li>- spindle shape.</li> <li>- basophilic cytoplasm.</li> <li>- pale oval nucleus.</li> <li>- Poorly developed golgi.</li> <li>- ribosomes</li> <li>- RER</li> <li>- mitochondria</li> </ul>	<ul style="list-style-type: none"> <li>• undergo mitotic function to differentiate to osteoblast.</li> </ul>
<b>osteoblasts</b>	from osteogenic cells	surface of the bone in a sheet like simple cuboidal cells.	<ul style="list-style-type: none"> <li>- very thin cytoplasmic processes.</li> <li>- irregular rounded cells.</li> <li>- deeply basophilic.</li> <li>- Nucleus is large, pale and rounded.</li> <li>- RER</li> <li>- well developed golgi complex in cytoplasm.</li> <li>- Ribosomes.</li> <li>- secretory vesicle.</li> <li>- mitochondria.</li> <li>- nucleus is extended with chromatin.</li> </ul>	<ul style="list-style-type: none"> <li>• synthesis of organic components.</li> <li>• Secrets alkaline phosphate enzyme.</li> </ul>
<b>osteocyte (matured)</b>			<ul style="list-style-type: none"> <li>- flat cells with less basophilic cytoplasm.</li> <li>- Pass through canaliculi.</li> <li>- small lacuna cavity singly.</li> </ul>	
<b>osteoclast</b>	from monocyte	on the surface where bone resorption occurs.	<ul style="list-style-type: none"> <li>- are large</li> <li>- motile multinucleated giant cells.</li> <li>- Acidophilic cytoplasm.</li> <li>- HOWSHIP'S LACUNAE.</li> </ul>	<ul style="list-style-type: none"> <li>• bone resorption.</li> </ul>

## osteoclast (HOWSHIP'S LACUNAE)



<b>RUFFLED BORDER</b>	<ul style="list-style-type: none"> <li>- numerous plasma membranes forming microvilli like structures.</li> </ul>
<b>CLEAR ZONE (SEALING)</b>	<ul style="list-style-type: none"> <li>- immediately surrounds the periphery of the ruffled border.</li> <li>- contain many actin microfilaments that hold the osteoclast to the bony surface.</li> </ul>
<b>VESICULAR ZONE</b>	<ul style="list-style-type: none"> <li>- region between the basal zone and the ruffled border.</li> <li>- Contain endocytic vesicles.</li> <li>- large vacuoles.</li> <li>- lysosomes (acid phosphates and collagenase).</li> <li>- pumps protons to produce an acidic environment.</li> </ul>
<b>BASAL ZONE</b>	<ul style="list-style-type: none"> <li>- contain most of the organelles.</li> <li>- multiple nuclei.</li> <li>- golgi complexes.</li> <li>- centrioles.</li> <li>- Mitochondria</li> <li>- RER</li> <li>- polysomes</li> </ul>

**Their main function is in:**

- *responsible for bone resorption and remodelling.*
  - *Secret collagenase, cathepsin K.*
  - *dissolving hydroxyapatite.*
  - *promoting the localised digestion of matrix proteins.*
- 
- controlled by local signalling factors and hormones.
  - have receptors for calcitonin, thyroid hormone and PTH.