

Recombinant Full-Length Parathyroid Hormone (1-84)

A Viewpoint by Dieter Felsenberg

Osteoporosis Research Group, University
Hospital Benjamin Franklin, Berlin, Germany

Osteoporosis is a disease associated with a misbalance of bone metabolism in which bone resorption exceeds bone formation. The result is a loss of bone strength due to a reduction in the integrity of the trabecular network and decreased cortical thickness. The ideal treatment would be an osteoanabolic repair of the trabecular network and a subperiosteal increase of cortical thickness. Treatment of osteoporosis with teriparatide or recombinant human parathyroid hormone (PTH[1-84]) reduces fracture risk by increasing bone strength, mainly through a positive influence on the trabecular network (increase of trabecular thickness and trabeculae numbers). Additionally, subperiosteal bone formation increases cortical thickness. The increased bone diameter consequently increases the moment of inertia, and bending stiffness and bone strength.

PTH(1-84) is identical to the 84-amino acid endogenous PTH, which is produced in the parathyroid glands. Although the N-terminal end of the molecule is responsible for the osteoanabolic effect, the C-terminal end may inhibit bone resorption, induce hypocalcaemic effects and promote osteocyte apoptosis. Teriparatide is the 34-amino acid N-terminal fragment of human PTH. This fragment is responsible for the osteoanabolic effect.

One of the advantages of PTH(1-84) is that it can be kept at room temperature for up to 1 week. This is very helpful for patients on holiday who may not have access to a refrigerator. Although subcutaneous injections are well tolerated, with adverse events such as nausea and headache significant but temporary, this route of administration is inconvenient and patients need to be taught how to administer it. Patients should also be monitored for hypercalciuria and hypercalcaemia. Finally, pharmacoeconomic aspects of treatment must be considered; however, there are currently no published pharmacoeconomic comparisons of teriparatide and PTH(1-84) available. ▲