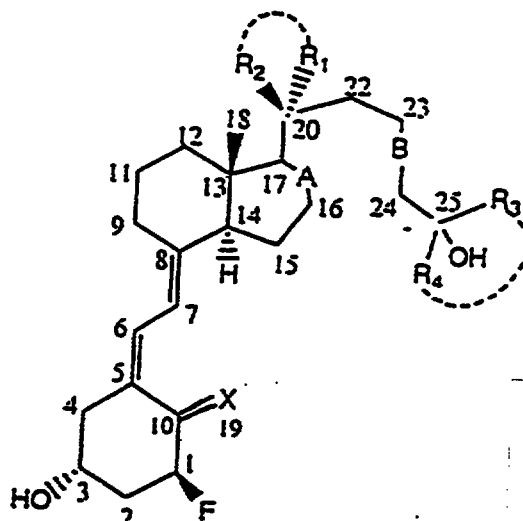


Abstract

The novel fluorinated Vitamin D₃ analogs of formula



wherein:

X is (H,H) or =CH₂;

R₁ and R₂ are, independently of each other, hydrogen, (C₁-C₄) alkyl or fluoroalkyl, or R₁ and R₂ together with C-20 form a (C₃-C₆) cycloalkyl or cyclofluoroalkyl, or R₁ and R₂ together form =CH₂;

R₃ and R₄ are, independently of each other, a (C₁-C₄) alkyl or fluoroalkyl, or R₃ and R₄ together with C-25 form a (C₃-C₉) cycloalkyl or cyclofluoroalkyl;

A is a single bond or a double bond; and

B is a double bond or a triple bond;

except that:

(i) when X is =CH₂, R₃ and R₄ are each CF₃, A is a double bond and one of R₁ or R₂ is hydrogen, then the other of R₁ or R₂ cannot be CH₃;

(ii) when X is =CH₂, R₃ and R₄ are each a (C₁-C₂) alkyl, A is a double bond and R₂ is hydrogen, then R₁ cannot be CH₃;

(iii) when X is =CH₂, R₃ and R₄ are each a (C₁-C₄) alkyl, A is a double bond and R₁ is hydrogen, then R₂ cannot be CH₃;

(iv) when X is =CH₂, one of R₃ or R₄ is a CF₃, A is a double

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bond, R_1 is CH_3 and R_2 is hydrogen, then the other of R_3 or R_4 cannot be CH_3 ; and

- (v) when X is (H,H) , R_3 and R_4 are each CF_3 , A is a double bond, B is a triple bond and R_2 is hydrogen, then R_1 cannot be CH_3 ,

and the compounds of the above formula I wherein:

X is (H,H) or $=CH_2$;

- R_1 and R_2 are, independently of each other, hydrogen, (C_1-C_4) alkyl or fluoroalkyl, or R_1 and R_2 together with C-20 form a (C_3-C_6) cycloalkyl or cyclofluoroalkyl, or R_1 and R_2 together form $=CH_2$;

R_3 and R_4 are, independently of each other, a (C_1-C_4) alkyl or fluoroalkyl, or R_3 and R_4 together with C-25 form a (C_3-C_9) cycloalkyl or cyclofluoroalkyl;

- A is a single bond or a double bond; and

B is a double bond or a triple bond;

except that where R_3 and R_4 are each CF_3 and A is a double bond and B is a triple bond and R_2 is hydrogen, then R_1 cannot be CH_3 ,

- are useful in the treatment of osteoporosis.

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