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Author	間宮, 緑(Mamiya, Midori) 高橋, 恭子(Takahashi, Kyoko) 江口, 早苗(Eguchi, Sanae) 森崎, 益雄(Morisaki, Masuo)
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Role of Cholesterol 10-Methyl Group and Effect of "Extra" 14-Methyl Group on Silkworm Growth and Development*

Midori MAMIYA, Kyoko TAKAHASHI, Sanae EGUCHI
and Masuo MORISAKI

間宮 緑, 高橋恭子, 江口早苗, 森崎益雄

In order to establish the functional importance of the 10-methyl group of cholesterol and the planarity of the steroid ring, silkworm (*Bombyx mori*) were reared on an artificial diet containing 19-norcholesterol, 14 α -methylcholesterol or 19,19-difluorocholesterol.

The former two sterols only partially satisfied the silkworm sterol requirement; growth and development were seriously retarded. The fluorinated sterol was much more deleterious and was totally inadequate in meeting the sterol requirement. Thus, 10-methyl group of cholesterol is important for eliciting its biological function, presumably through attractive van der Waals interaction with fatty acyl chain of membrane phospholipid. The 10-hydrogen atom of 19-norcholesterol and the difluoromethyl group of 19,19-difluorocholesterol may be too small, or too electronegative, respectively. It is also clear that 14 α -methylcholesterol only partially satisfies the silkworm sterol requirement. Protrusion of the 14 α -methyl group from the plane of steroid ring may account for the observed deleterious effect, suggesting the functional importance of the planarity of cholesterol structure.

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