E245 Structural Relationship Between Brassinosteroids and Steroids in *Marchantia polmorpha*: configuration at C24

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The presence of brassinosteroids (BRs), a collective name of steroidal plant hormones, in lower plants has been already demonstrated in a green alga and a fern. Thus, liverworts which are higher than algae would be expected to contain BRs. To vertify that, we investigated BRs in a liverwort, *Marchantia polymorpha* in this study. After HPLC, the extracts obtained from *Marchantia* gave rise to three biologically-active fractions. The fractions were derivatized as a bismethanboronate, and analyzed by a capillary GC-MS and/or GC-SIM. Castasterone and 6-deoxocastasterone were fully identified, and brassinolide was tentatively characterized. With respect to C-24 configuration, the presence of these BRs in the lower plant is unusual because they carry 24α-methyl. This led us examine the configuration at C-24 of 24-methylcholesterol in the plant. 300㎒ ^{1}H-NMR analysis revealed that *Marchantia* contains a mixture of 24α- and 24β-epimers of 24-methylcholesterol. Thus it is thought that BRs in *Marchantia* are biosynthesized from the 24α-methylcholesterol as higher plants do.

E246 Differential Antioxidant Systems in Interactions between Pepper Fruits and Anthracnose Fungus

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In response to pathogen attack, one of the earliest reactions of plants is the production of active oxygen species (AOS). AOS have been also found to play a couple of critical roles in defense responses during plant-pathogen interactions. In our previous report, the anthracnose fungus, *Colletotrichum gloeosporioides*, was shown to have an incompatible interaction with ripe-red fruit of pepper (*Capsicum annuum*). However, the fungus had a compatible interaction with unripe-mature green fruit. The differential responses against fungal infection during pre- and post-ripening stages of the fruit have been used as a model system to study plant-pathogen interactions. We examined the generation of reactive oxygen species and antioxidant systems with pathosystem. During germination of fungal spores, massive generation of AOS occurred in pepper cells of unripe fruit, but not in those of ripe fruits. After fungus invaded into the epidermal cell of unripe fruit, the accumulation of AOS was substantially decreased. In accordance with the elevated levels of AOS, the expression of the genes encoding Cu/Zn-superoxide dismutase (Cu/ZnSOD) and ascorbate peroxidase was induced in the unripe fruit. In contrast, generation of AOS was hardly detected in the ripe fruit where the Cu/ZnSOD was basically expressed and fungal invasion was suppressed. To clarify redox regulatory mechanisms in unripe and ripe fruits, the antioxidant status was examined in the fruits after the treatment of superoxide generator, methyl viologen. Antioxidant activity was much higher in the ripe fruit so that the antioxidants could ameliorate injurious effects of AOS on delicate cellular constituents. These results suggest that higher antioxidant activity is involved in defense mechanism of the ripe fruit to protect seed maturity and fruit integrity against biotic stress during fruit ripening