

S06-2 Adaptive coevolution of camptothecin production and self resistance in plants

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The plant-derived monoterpenoid indole alkaloid, camptothecin (CPT), induces cell death by targeting DNA topoisomerase I (Top1), then its derivatives are used as anti-cancer drugs. We found that Top1s in CPT-producing plants are resistant to CPT with three amino acid substitutions. Especially, the substitution Asn722Ser is identical to that found in CPT-resistant human cancer cells. Furthermore, comparative analysis of Top1s of CPT-producing and nonproducing plants suggested that the molecular mechanism of self-resistance to CPT and the adaptive coevolution between the CPT production system and its target Top1 in the producing plants.