Studies on evaluation of natural products for antiviral effects and their applications

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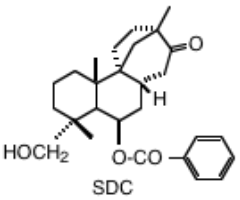
In the search for novel antiviral molecules from natural products, we have discovered various antiviral molecules with characteristic action mechanisms.



SDC

One of them is an aphidicolin-like tetracyclic diterpene named scopadulciol (SDC), which was isolated from a tropical medicinal plant *Scoparia dulcis* L.. SDC showed stimulatory effect on antiviral potency of acyclovir (ACV) or ganciclovir (GCV). Such effect of SDC revealed to be exerted by activation of viral thymidine kinase (HSV-1 TK) and, as a result, increase in cellular concentration of the active form of ACV/GCV, i.e. triphosphate of ACV or GCV. On the basis of these experimental results, cancer gene therapy using HSV-1 *tk* gene and SDC together with ACV/GCV was found to be effective in suppressing the growth of cancer cells.

Acidic polysaccharides such as calcium spirulan (Ca-SP) from *Spirulina platensis*, nostoflan from *Nostoc flagelliforme*, sodium hornan from *Sargassum horneri*, and fucoidan from sporophyll of *Undaria pinnatifida* were also found to be potent inhibitors against enveloped viruses. Their antiviral potency was dependent on molecular weight, content of sulfate or carboxyl group as well as counter ion species chelating with sulfate groups, indicating importance of three dimensional structure of the molecules. In addition, unlike dextran sulfate, Ca-SP was indicated to target on not only viral absorption/penetration stages but also some replication stages of progeny viruses after penetration into cells. Ca-SP was also suggested to be a possible candidate of therapeutic drugs for cancer or arteriosclerosis.