

Unravelling the anti-influenza virus activity of *Rhodiola rosea*

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Adaptogens and their constituents have been discussed as promising agents in the prophylaxis and treatment of respiratory infections (Brendler et al., 2021).

Recently, we identified a distinct anti-influenza virus activity for the standardized hydro-ethanolic extract of *R. rosea* (SHR-5[®]) with an IC₅₀ against HK/68 (H3N2) of 2.83 µg/mL without being cytotoxic. For a fast and efficient isolation and identification of the extract's bioactive constituents, a high-performance counter-current chromatographic (HPCCC) separation method was developed. The elaborated method allowed to fractionate the complex roseroot extract in a single chromatographic step in a way that only one additional orthogonal isolation/purification step per fraction yielded twelve isolated constituents from the group of phenylethanoids, phenylpropanoids, cyanogenic and monoterpene glycosides, and flavonoids [2]. The antiviral activity was determined in a cytopathic effect inhibition assay for the isolated metabolites. Intriguingly, a tannin-depleted (TD) and a tannin-enriched fraction (TE) of SHR-5[®] revealed a promising anti-influenza virus activity for the latter fraction and the isolated flavonoids, rhodiosin and triclin. The antiviral profile of SHR-5[®] was determined using five currently circulating type A and B influenza virus strains with different drug susceptibilities. The results demonstrated a direct and broad-spectrum anti-influenza virus activities as well as a lack of resistance development to SHR-5[®][3].

[1] Brendler, T., Al-Harrasi, A., Bauer, R., Gafner, S., Hardy, M.L., Heinrich, M., Hosseinzadeh, H., Izzo, A.A., Michaelis, M., Nassiri-Asl, M., Panossian, A., Wasser, S.P., Williamson, E.M. Botanical drugs and supplements affecting the immune response in the time of COVID-19: Implications for research and clinical practice. *Phytother. Res.* (2021) 35: 3013-3031.

[2] Langeder, J.; Grienke, U.; Doering, K.; Jafari, M.; Ehrhardt, C.; Schmidtke, M.; Rollinger, J.M. High-performance countercurrent chromatography to access *Rhodiola rosea* influenza virus inhibiting constituents. *Planta Med.* (2021) 87: 818-826

[3] Doering, K.; Langeder, J.; Duwe, S.; Tahir, A.; Grienke, U.; Rollinger, J.M.; Schmidtke, M. Insight into the direct anti-influenza virus mode of action of *Rhodiola rosea*. *Phytomedicine* (2022) 96: 153895