

## Summary of Grape and Immune Health Studies

Research is sought on grapes and immune health. The commission has not yet funded research in this area, but external studies have been conducted on grape compounds resveratrol, quercetin, and vitamin K for their influence on immunity. Further information is provided in citations below.

### PUBLISHED RESEARCH

#### Polyphenols

Ding, S., Jiang, H., & Fang, J. (2018). Regulation of immune function by polyphenols. *Journal of Immunology Research*. Doi.org/10.1155/2018/1264074.

#### Resveratrol

Malaguarnera, L. (2019). Influence of resveratrol on the immune response. *Nutrients*. 11(5).

Filardo, S., Di Pietro, M., Mastromarino, P., & Sessa, R. (2020). Therapeutic potential of resveratrol against emerging respiratory viral infections. *Pharmacology & Therapeutics*, 214, 107613. Doi:10.1016/j.pharmthera.2020.107613.

Ramdani, L.H. & Bachari, K. (2020). Potential therapeutic effects of resveratrol against SARS-CoV-2. *Acta Virol*, 2020;64(3)276-280. Doi:10.4149/av\_2020\_309.

Feng, L., Yasmineen, R., Schoene, N. W., Lei, K.Y., & Want, T.T.Y. (2019). Resveratrol differentially modulates immune responses in human THP-1 monocytes and macrophages. *Nutrition Research*, Dec;72:57-69. Doi: 10.1016/j.nutres.2019.10.003.

Moussa, C., Hebron, M., Huang, X., Ahn, J., Rissman, R.A., Aisen, P.S., & Turner, R.S. (2017). Resveratrol regulates neuro-inflammation and induces adaptive immunity in Alzheimer's disease. *Journal Neuroinflammation*, Jan 3; 14(1):1. Doi:10.1186/s12974-016-0779-0.

Marinella, M. (2020). Indomethacin and resveratrol as potential treatment adjuncts for SARS-CoV-2/COVID-19. *International Journal Clinical Practice*, Sept;74(9):e13535. Doi:10.1111/ijcp.13535.

Farkhondeh, T., Fogado, S.L., Pourbagher-Shahri, A.M., Ashrafizadeh, M., & Samarghandian, S. The therapeutic effect of resveratrol: focusing on the Nrf2 signaling pathway. *Biomedicine & Pharmacotherapy*, 127 (2020) 110234. Doi: 10.1016/j.biopha.2020.110234.

## Quercetin

Brito, J.C.M., Lima, W.G., Cordeiro, L.P., & Da Cruz Nizer, W.S. (2021). Effectiveness of supplementation with quercetin-type flavonols for treatment of viral lower respiratory tract infections: systemic review and meta-analysis of preclinical studies. *Phytotherapy Research*, 2021: 1-13. Doi:10.1002/ptr.7122

Li, Y., Yao, Jiaying, Han, C., Yang, J., Chaudhry, M.T., Wan, S., Liu, H., & Yin, Y. (2016). Quercetin, inflammation and immunity. *Nutrients*, 8,167. Doi:10.3390/nu8030167.

Choi, H.J., Song, J. H., Park, K.S., & Kwon, D.H. (2009). Inhibitory effects of quercetin 3-rhamnoside on influenza A virus replication. *Eur J Pharm Sci Jun 28:37(3-4):329-33*. Doi:10.1016/j.ejps.2009.03.002

Choi, H.J., Song, J. H., Park, K.S., & Kwon, D.H. (2012). Quercetin 3-rhamnoside exerts anti influenza A virus activity in mice. *Phytother Res. Mar 26(3):462-2*. Doi:10.1002/ptr.3529.

Mlcek, J., Jurikova, T., Skrovankova, S., and Sochor, J. (2016). Quercetin and its anti-allergic immune response. *Molecules*, May 12:21(5). Doi: 10.3390/molecules21050623.

## Vitamin K

Dofferhoff, A.S., Piscaer, I., Schurgers, L.J., Visser, M.P.J., et al. (2020). Reduced vitamin K status as a potentially modifiable risk factor of severe coronavirus disease. *Clin Infect Disease*. doi:10.1093/cid/claa/258.

Janssen, R., Visser, M.P.J., Dofferhoff, A.S.M., Vermeer, C., Janssens W., Walk, J. (2020). Vitamin K metabolism as the potential missing link between lung damage and thromboembolism in Coronavirus disease 2019. *British Journal of Nutrition*, doi: 10.1017/S0007114520003979.

Anastasi, E., Lalongo, C., Labriola, R., Ferragut, G., Lucarelli, M., and Angeloni, A. (2020). Vitamin K deficiency & Covid-19. *Scand J Clin Lab Invest*, 80:7, 525-527. <https://doi.org/10.1080/00365513.2020.1805122>.