

Risk of burnout can be estimated by analysing saliva samples

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Risk of burnout can be estimated by analysing saliva samples. Credit: Medical University of Vienna

According to calculations from the World Health Organisation, depression occupies first place in the global "disease burden" and, by

2030, experts estimate that there will be three mental illnesses in the Top 5: depression, Alzheimer's and other forms of dementia and alcohol addiction. Even Austria is seeing an increase in mental problems such as burnout and, since 2010, these have been the main reason for invalidity retirement. Researchers from MedUni Vienna and the Health Insurance Agency's Health and Prevention Center have now shown that burnout can be identified by means of a simple saliva test. The hormone cortisol is the marker used for this.

Cortisol is actually an anti-[stress](#) hormone, which activates metabolic break-down processes, thereby making energy-rich compounds available to the human body. Its damping effect on the immune system is also used to prevent over-reactions and to suppress inflammation. Cortisol is predominantly produced in the early morning on waking, to crank up the circulation, as it were.

In healthy people, the cortisol level then falls again over the course of the day – until there is practically no measurable cortisol left by the evening. The picture is very different for people who are under constant stress: the body keeps the [cortisol level](#) within the measurable range for much longer, in order to cope with the prevailing stress – if the stress then becomes "chronic", cortisol levels remain high without any normal daily pattern.

The three lead investigators, Helmuth Haslacher and Alexander Pilger from the Division of Medical-Chemical Laboratory Diagnostics (KILM) of MedUni Vienna and Robert Winker from the stress clinic at the Health and Prevention Center of the KFA (Health Insurance Agency) have now shown that elevated cortisol levels can be detected by means of a single saliva sample, taken either at midday or in the evening, so that the risk of [burnout](#) can be measured.

The study involved comparing the work-related stress and cortisol levels

of burnout patients with those of healthy employees. "It was found that people who were identified as having a high level of work-related stress using psychological methods had noticeably higher cortisol values at midday and also in the evening. We also observed an improvement in the clinical course and [cortisol](#) levels of patients receiving treatment in the special stress clinic set up by the KFA. This means that we can use these markers for preventively identifying people who are at greater risk of burnout," say the experts. Follow-on studies are therefore to be conducted to evaluate this result and to develop a valid biochemical testing system for use in everyday clinical practice to identify high-risk candidates for burnout.

According to the researchers, compared with the previously used early-morning samples – taken three times after waking at fifteen-minute intervals – the midday and evening saliva samples also provided a much better and more reliable result: "Our current data indicate that people at risk of burnout can be identified from a single saliva sample with almost 100 percent accuracy, whereas the multiple early-morning sampling involved more laborious methods and produced a much larger range of variation." Reliable analysis is now possible just four hours after providing the sample and this method even produced better results than analysing stress-related blood parameters. "We will use these results to further reinforce our efforts to prevent stress-related illnesses in collaboration with the stress clinic of the KFA Health and Prevention Center.

More information: Alexander Pilger et al. Midday and nadir salivary cortisol appear superior to cortisol awakening response in burnout assessment and monitoring, *Scientific Reports* (2018). [DOI: 10.1038/s41598-018-27386-1](https://doi.org/10.1038/s41598-018-27386-1)

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