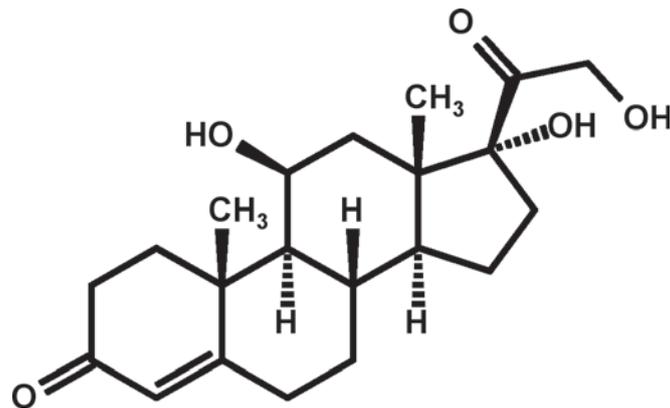


# Cortisol-Salivette<sup>®</sup>

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## Saliva Collection Device



## Evaluation Report

by:



With the rising diagnostic importance of analytes with rhythmically changing values (e.g. hormones or drugs) it is necessary to easily obtain high quality diagnostic samples. Many studies verify the suitability of **saliva** as sample material<sup>1</sup>.

The collection of saliva by spitting or drooling is not aesthetically pleasing. To stimulate the saliva flow, recommendations to chew on wax pellets or parafilm<sup>®</sup> can be found, although it is clear that some analytes can be lost through adsorption in this process<sup>2</sup>.

The **Salivette**<sup>®</sup> saliva collection device provides a more hygienic alternative: The patient places the swab in the mouth where it easily absorbs saliva. Jaw movement- will stimulate additional saliva flow. The saturated swab is placed back into the Salivette<sup>®</sup>, capped and sent to the laboratory. Centrifugation for 2 minutes at 1000 x g delivers clear saliva. Any mucous material or solid substances (food debris) are collected in the specially designed conical tube base.

The simple design of the Salivette<sup>®</sup>, makes it easy for patients to collect their own samples throughout the day, which may be necessary for certain analytes.

The Salivette<sup>®</sup> is available with three different swab types: plain cotton, cotton treated with citric-acid to stimulate the saliva flow, and a new material specially developed for Cortisol determinations.

Due to its high clinical relevance, **Cortisol** is one of the most important analytes that can be determined from saliva<sup>3</sup>. The Salivette<sup>®</sup> with plain cotton swab is suitable<sup>4</sup> if the saliva volume reaches at least 1 ml. Also, when the cortisol level is in the trace range, values that are too low cannot be totally excluded.

The new Cortisol Salivette is designed to achieve precise analytical values from small volumes and samples with very low cortisol levels. The effectiveness of the **Cortisol Salivette**<sup>®</sup> is demonstrated below:

A high saliva recovery rate from the swab is an important requirement for reliable analysis of *small volume samples*, e.g. from children.

As shown in Fig. 1, the Cortisol Salivette<sup>®</sup> yields a high sample recovery rate upon centrifugation. For example, an 80% recovery rate is achieved for even a tiny 200 µl sample. This is more than sufficient, as cortisol can be determined from samples as small as 50 µl. Tests with adult volunteers revealed an average saliva recovery volume of 1.1 +/- 0.3 ml.

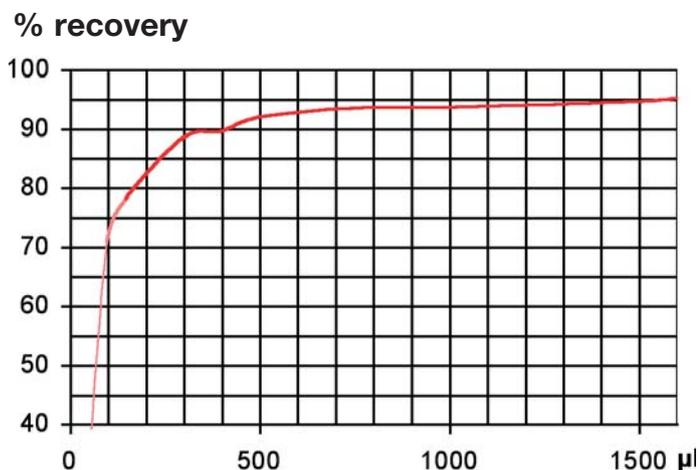


Fig. 1: Recovery rate of the added water volume in Cortisol Salivettes after centrifugation (2 min, 1,000 x g)

The efficacy of the Cortisol Salivette<sup>®</sup> is established not only in the recovered sample volume, but more importantly in the *volume of cortisol recovered*. There is always a risk of substance loss due to surface absorption with any absorbent material, which carries particular weight in the case of small volumes and low concentrations.

To have enough homogeneous sample material, various artificial saliva solutions (according to DIN 53160-1) were spiked with cortisol to defined concentrations. These artificial saliva solutions were pipetted onto the swabs in different volumes. The Cortisol concentrations in the centrifugates were determined by means of two commercially available kit systems: an established ELISA kit from Salimetrics, USA and a new LIA kit from IBL Hamburg<sup>5</sup>.

## % recovery

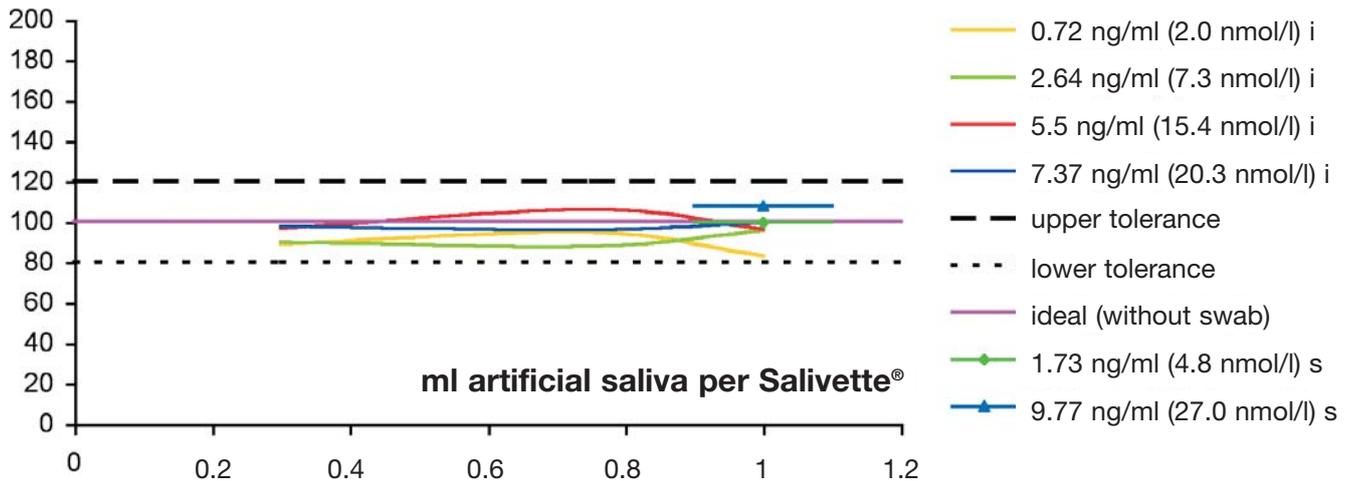


Fig. 2: Cortisol recovery rate at different artificial saliva volumes and cortisol concentrations  
i: IBL LIA, s: Salimetrics EIA

As shown in Fig. 2, the cortisol recovery rate is always close to 100 %, regardless of the saliva volume, cortisol concentration or test procedure.

The general suitability of the Cortisol Salivette® is further demonstrated by the following correlation graph:

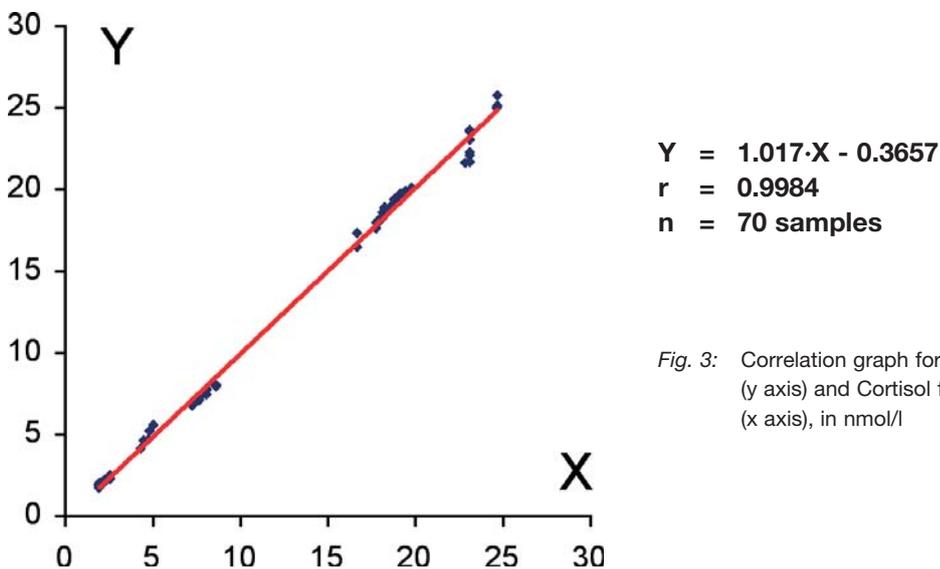


Fig. 3: Correlation graph for Cortisol from Cortisol Salivettes (y axis) and Cortisol from Salivettes without swab (x axis), in nmol/l

### Conclusion:

**The Cortisol Salivette® is an effective saliva collection device for diagnostic tests even from low volumes samples and/or samples with low Cortisol concentrations.**

The Cortisol Salivette® was especially developed for the determination of salivary Cortisol. Its suitability for other salivary analytes is possible though cannot be assured. Users should perform suitability tests of their own.

## References:

<sup>1</sup> Selected Reviews (see references there, too):

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Haeckel R, Hänecke P: Application of Saliva for Drug Monitoring - An In Vivo Model for Transmembrane Transport, *Eur J Clin Chem Clin Biochem* **1996**, 34,171-191.

Kaufmann E, Lamster IB: The Diagnostic Applications of Saliva - A Review, *Crit Rev Oral Biol Med* **2002**, 13, 197-212.

Hodinka RL, Nagashunmugam T, Malamud D: Detection of Human Immunodeficiency Virus Antibodies in Oral Fluids, *Clin Diagn Lab Immun* **1998**, 5, 419-426.

<sup>2</sup> Danhof M, Breimer DD: Therapeutic Drug Monitoring in Saliva, *Clin Pharmacokinetics* **1978**, 3, 29-57.

<sup>3</sup> Kirschbaum C, Hellhammer DH: Salivary Cortisol in Psychoneuroendocrine Research: Recent Developments and Applications, *Psychoneuroendocrinology* **1994**, 19, 313-333.

Hellhammer J, Fries E, Buss C, Engert V, Tuch A, Rutenberg D, Hellhammer D: Effects of Soy Lecithin Phosphatidic Acid and Phosphatidylserine Complex (PAS) on the Endocrine and Psychological Responses to Mental Stress, *Stress* **2004**, 7, 119-126.

Hellhammer J, Hellhammer D: Ein neuer Weg in der Stressdiagnostik: Neuropattern, in: Stubbe H, Follmann W (Hrsg.): Interventionen in der Angewandten Psychologie, Shaker Verlag Aachen, **2004**, S. 19-26.

<sup>4</sup> Roche Diagnostics: Product Information Summary: Elecsys® Cortisol in Saliva, Nr. 11875116122 (Modular Analytics E170), S. 5.

<sup>5</sup> Westermann J, Demir A, Herbst V: Determination of Cortisol in Saliva and Serum by a Luminescence-Enhanced Enzyme Immunoassay, *Clin Lab* **2004**, 50, 11-24.

## Ordering information

Order No.	Length / Ø (mm)	Description	Packaging
51.1534	97 / 16,8	Cotton swab without preparation	500/case 100/bag
51.1534.001	97 / 16,8	Cotton swab with citric acid	500/case 100/bag
51.1534.500	97 / 16,8	Cortisol-Salivette®	500/case 100/inner box



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