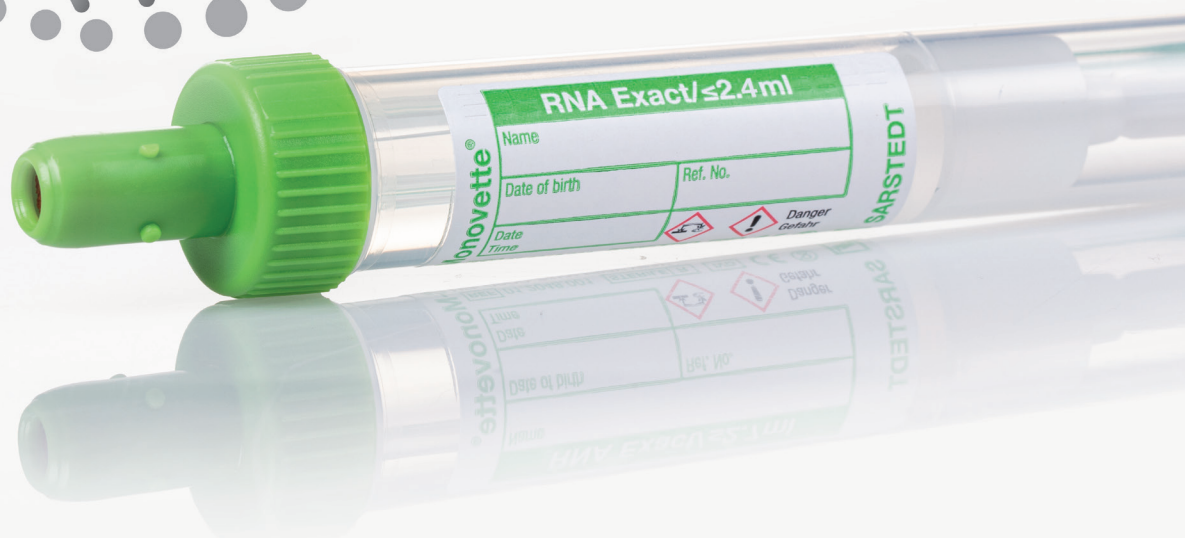


S-Monovette® RNA Exact

For standardised gene
expression analysis



**Molecular
Diagnostic
Workflow**



- Immediate stabilisation of RNA
- Optimum compatibility with standard commercial isolation kits
- Top RNA yields ensure valid analysis results

AT A GLANCE

- ✓ Gentle aspiration technology
- ✓ Stabilisation without limitations
- ✓ Significantly faster isolation
- ✓ Maximum RNA yields



RNA analysis is becoming increasingly important and is used in a wide range of applications. By identifying the expression patterns of specific genes, it is now even possible to evaluate the stage of illnesses or prognosis of diseases.

The new S-Monovette® RNA Exact can be used to acquire a sample volume of up to 2.4 ml. The immediate stabilisation of the entire RNA standardises sample collection for RNA-based analyses and enables the blood sample to be transported safely to the laboratory for analysis.

The preparation prevents the degradation of the RNA, as well as the unnatural re-synthesis of RNAs after sample collection (induction of stress genes).

Advantages of the new S-Monovette® RNA Exact:

- Blood collection possible using gentle aspiration technique and vacuum technique (2 systems in one product)
- No limitations to stabilisation of different transcripts and maximum RNA yields
- Significantly faster RNA isolation possible compared to other established systems

The stabilisation performance of the S-Monovette® RNA Exact is validated over:

- 5 days at room temperature (22°C)
- 14 days in chilled conditions (8°C)

See also Fig. 2–4 on page 5



Save time during manual sample preparation

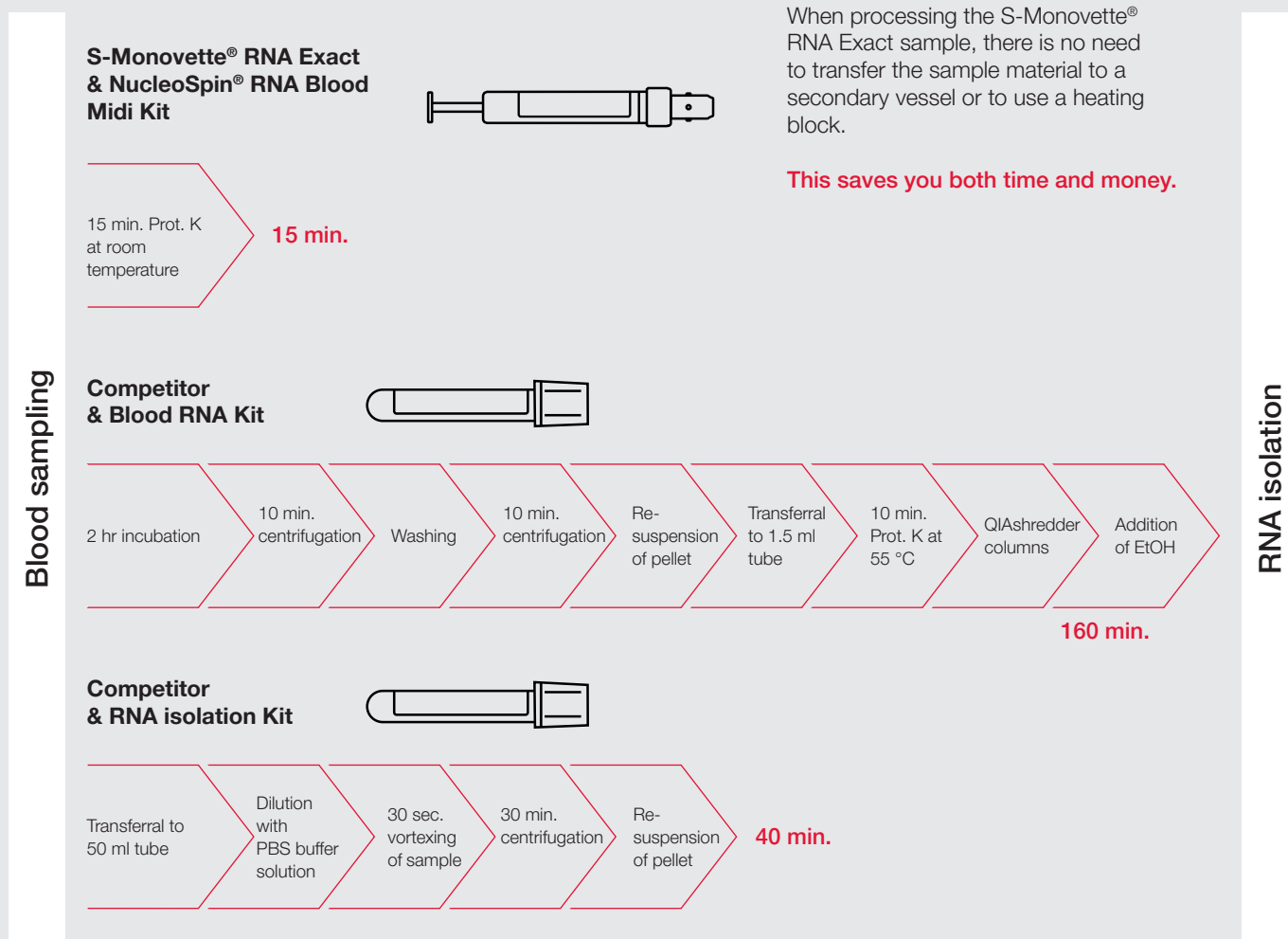
The sample material from the S-Monovette® RNA Exact can be used directly for RNA isolation. There is no need for laborious sample preparation.

Because initial pelletization of the RNA can be dispensed with during RNA isolation, there is no need for time-intensive incubation and centrifugation steps.

The direct isolation of the RNA and the substantially quicker processing of samples reduces the time until the result is ready.



The following diagram illustrates the time saved:



FLEXIBLE CHOICE OF ISOLATION SYSTEM



A big advantage of the S-Monovette® RNA Exact is that it is not tethered to one particular isolation system. The isolation systems listed below are individually selectable and are optimally tailored to the S-Monovette® RNA Exact. This flexibility when selecting the isolation system means that maximum RNA yields can be achieved at a reduced cost.

Because an initial centrifugation step is not required, the RNA Exact samples can also be processed automatically with ease – unlike in other systems.

1. Manual isolation systems

- NucleoSpin® RNA Blood Midi Kit, made by MACHERY-NAGEL, **REF 740210.20**

Maximum RNA yields with outstanding stabilisation performance

Because of their biological function, many RNA molecules are quickly synthesised from the cells and rapidly broken down again. It is known, for example, that the expression of *IL-8* in the cells of the blood sample increases markedly after sampling [1]. Furthermore, RNA also degrades very quickly, as the result of widely occurring enzymes (RNases) or the effect of heat.

An RNA stabiliser must therefore have a two-fold effect; one, it must prevent a re-synthesis of RNA after blood sampling, and two, it must inhibit any degradation of the RNA.

The stabilisation performance of the S-Monovette® RNA Exact was compared with that of an EDTA blood sample and of two RNA-stabilising competitor products.

Fig.1 shows that the highest RNA yield was achieved with the S-Monovette® RNA Exact (storage temperature 22 °C).

- NucleoSpin® Dx RNA Blood, IVD kit for RNA isolation from S-Monovette RNA Exact, made by MACHERY-NAGEL, **REF 740201.50**
- NucleoSpin® RNA Blood Mini Kit, made by MACHERY-NAGEL, **REF 740200.50**

2. Automated isolation systems

- chemagic Total RNA 9k Kit H24, made by Revvity chemagen Technologie GmbH, **REF CMG-1084-S**
- InviMag Blood RNA Exact Kit/IG (8x12), made by Invitek Molecular, **REF 2463320100**
- NucleoMag RNA Blood Kit, made by MACHERY-NAGEL, **REF 744352.1**

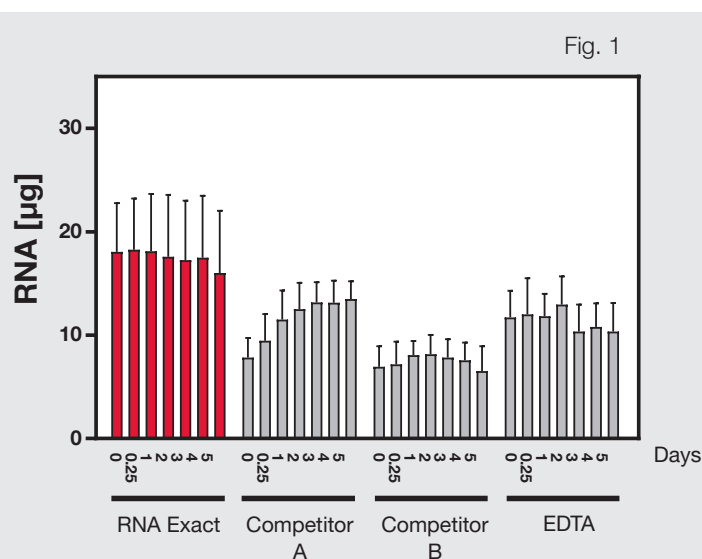


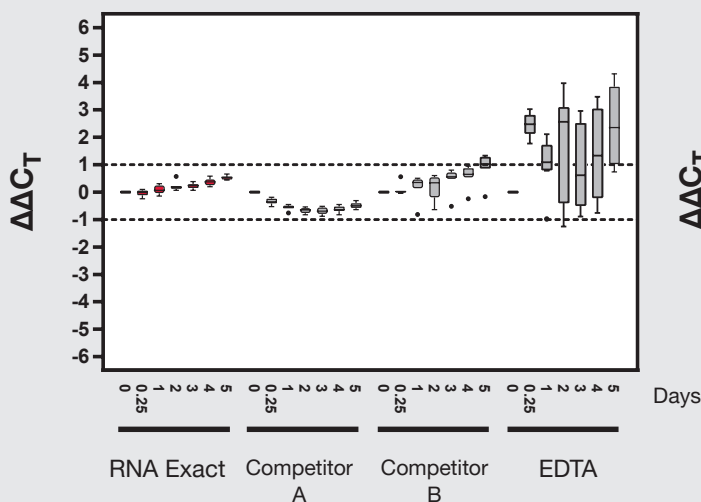
Figure 1 Quantities of RNA for four different blood-sample tubes over five days at 22°C: S-Monovette® RNA Exact, Competitor A, Competitor B, S-Monovette® EDTA.





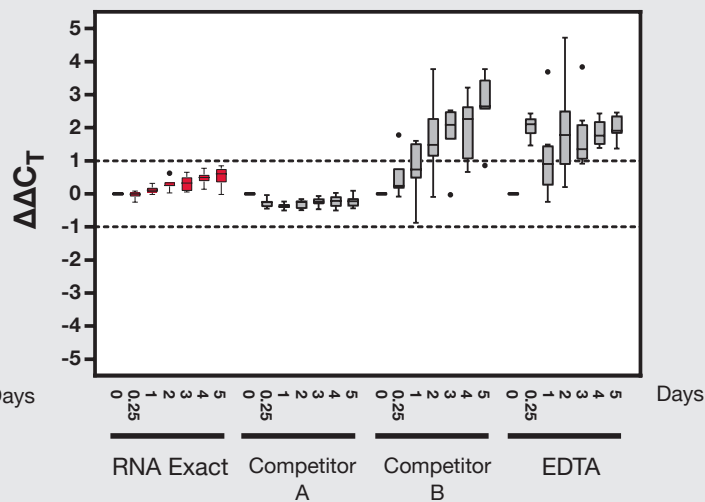
IL1B

Fig. 2



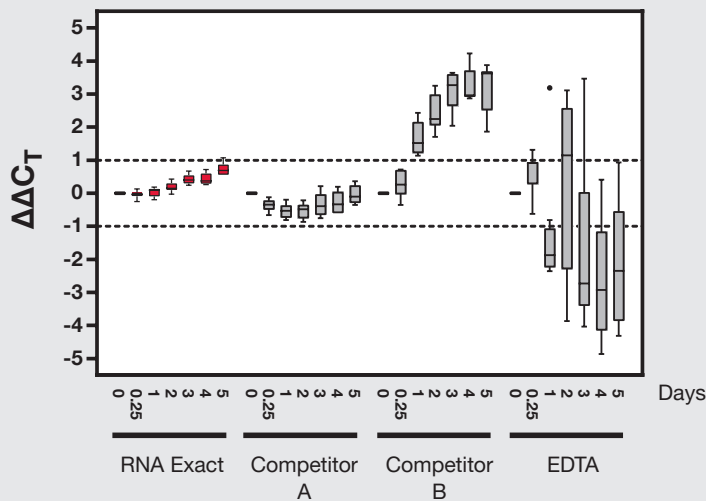
FOS

Fig. 3



IL8

Fig. 4



Figures 2, 3 & 4 illustrate the outstanding stabilisation performance of the S-Monovette® RNA Exact with qPCR analyses of the genes *IL1B*, *FOS* and *IL8*. The S-Monovette® RNA Exact achieves conservation of the expression level of the gene at the time of sampling ($\Delta\Delta CT < 1$, storage period 0–5 days, storage temperature 22°C).

Detailed information and other analysed genes are presented in the white paper “Impact of RNA Stabilising Blood Collection Tubes on Gene Expression Data Validity – A Comparison of S-Monovette® RNA Exact, PAXgene™ Blood RNA Tubes & Tempus™ Blood RNA Tubes”, which can be downloaded free of charge from the Sarstedt website.

Stabilisation of at least 47,000 transcripts with the S-Monovette® RNA Exact

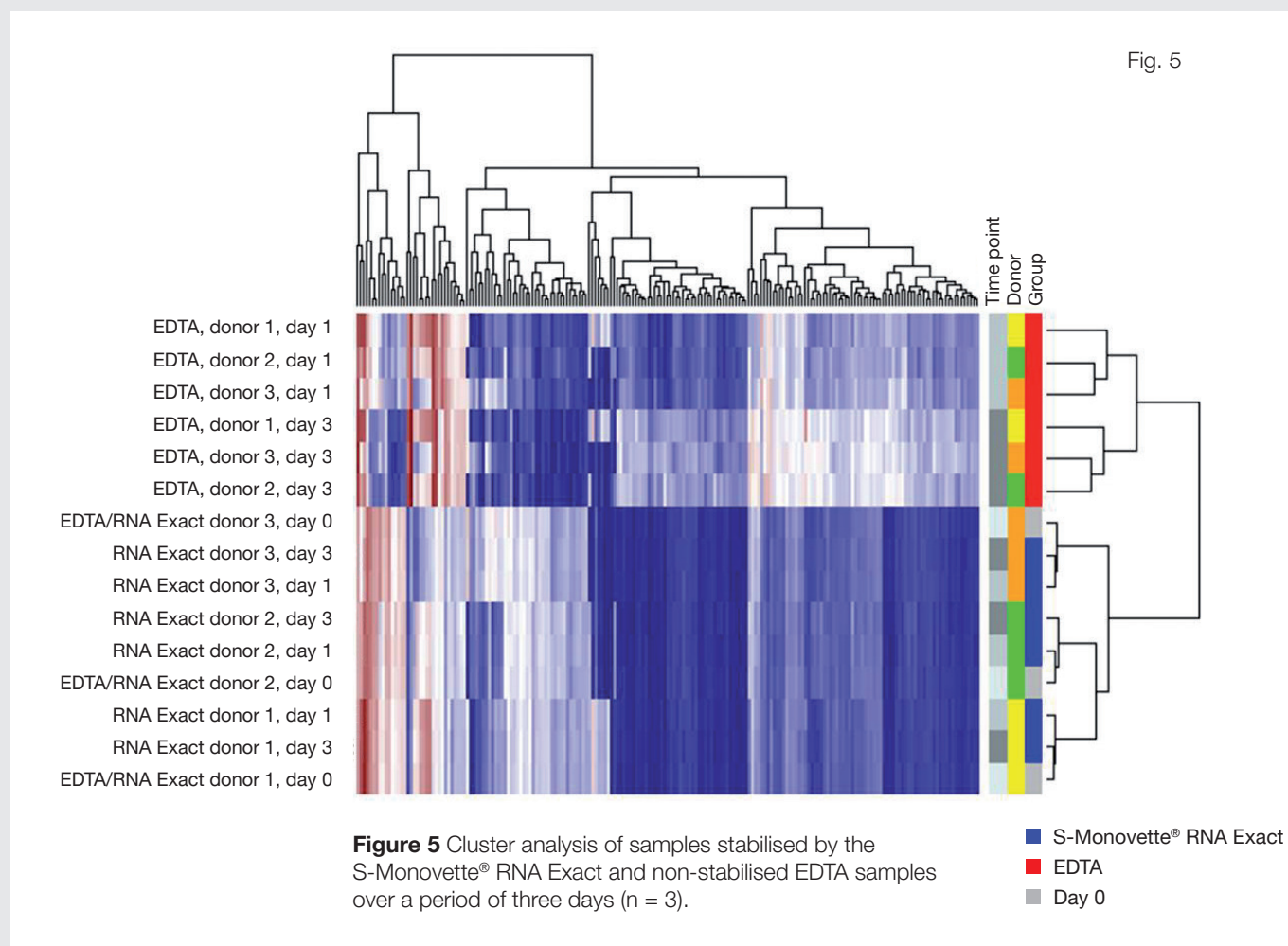
The established blood-sampling systems on the market exhibit limitations in terms of an equivalent stabilisation of all transcripts [2]. The RNA-stabilising performance of the S-Monovette® RNA Exact was analysed with the HumanHT-12 v4 BeadChip (REF BD-103-0204, Illumina San Diego, USA) by an independent laboratory in order to test the stabilisation of as large a number of transcripts as possible.

Figure 5 shows the result of the cluster analysis. For EDTA samples (no RNA stabilisation), the analysis shows a clustering by time points. The change in the transcripts over the storage period is greater than the biological variability

between donors. This meant that non-stabilised EDTA samples are affected by the storage time.

The samples stabilised by the S-Monovette® RNA Exact are clustered by donor and not over time (including the day 0 samples). The change in expression pattern over time is smaller than the biological variability between donors. The RNA-chip analysis thus shows very good conservation of the expression pattern over the measured time points.

The S-Monovette® RNA Exact samples stabilise all 47,000 investigated transcripts of the HumanHT-12 v4 BeadChip over a period of at least three days.



- Filled Monovettes can be collected and transported over several days before processing, with no loss of quality
- The S-Monovette® DNA Exact exhibits no limitations with regard to the stabilisation of different transcripts
- Maximum RNA yields can be obtained
- Due to the advantages of RNA isolation, results are available more quickly than with other products

SUMMARY

- ✓ The S-Monovette® RNA Exact makes everyday laboratory work and multicentre studies much easier!

Ordering information

Order no	Description	Packaging
01.2048.001	S-Monovette® RNA Exact ≤ 2.4 ml	20 per inner carton/ 80 per outer carton

Accessories

Order no	Description	Packaging
85.1637.235	Safety Multifly® cannula 20G with 200 mm tube and assembled Multi-Adapter	120 per inner carton/ 480 per outer carton
85.1638.235	Safety-Multifly® cannula 21G with 200 mm tube and assembled Multi-Adapter	120 per inner carton/ 480 per outer carton
85.1640.235	Safety-Multifly® cannula 23G with 200 mm tube and assembled Multi-Adapter	120 per inner carton/ 480 per outer carton
85.1642.235	Safety-Multifly® cannula 25G with 200 mm tube and assembled Multi-Adapter	120 per inner carton/ 480 per outer carton
95.1006	Single-use tourniquet tournistrip®	200 per outer carton
78.898	Protective container 126 x 30 mm, with absorbent liner, without cap	50 per inner carton/ 250 per outer carton
65.679	Screw cap for protective container 126 x 30 mm	50 per inner carton/ 250 per outer carton
95.900	Box for shipping, small 198x107x38 mm	50 per outer carton
95.901	Box for shipping 198x107x50 mm	50 per outer carton
95.902	Box for shipping, large 220x170x40 mm	50 per outer carton

Other PCR consumables (PCR plates, strips and single vessels), pipette tips and reaction vessels can be found on www.sarstedt.com.

SARSTEDT AG & Co. KG

P.O. Box 12 20

D-51582 Nümbrecht

Phone: +49 2293 305 0

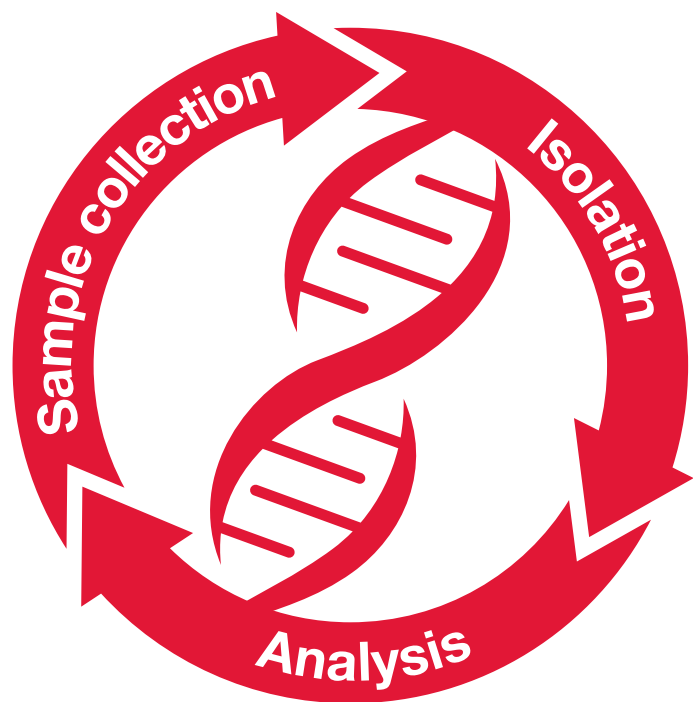
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The SARSTEDT molecular diagnostics workflow

Benefit from the advantages of our coordinated consumables!



References:

1. Gunther, Kalle; Malentacchi, Francesca; Verderio, Paolo; Pizzamiglio, Sara; Ciniselli, Chiara Maura; Tichopad, Ales et al. (2012): Implementation of a proficiency testing for the assessment of the preanalytical phase of blood samples used for RNA based analysis. In: Clinica chimica acta; international journal of clinical chemistry 413 (7-8), S. 779-786.
2. Menke, Andreas et. al. (2012). In: BMC Research Notes. DOI: 10.1186/1756-0500-5-1