NOVATEC™
INTERNATIONAL GROUP

RNAssist

RNAssist specializes in next generation tissue fixation and biomolecule stabilization for research applications. Their products are compatible with all biological sample types. The RNAssist range includes vivoPHIX and genoPHIX

The Novatec team is proud to be the global supply partner in the AMERICAS for RNAssist.

Non-hazardous reagent - does not contain guanidine unlike other RNA stabilising reagents

Biomolecule Stabilization

Long term stabilization of RNA, DNA, proteins and phosphoproteins

Cell & TissueFixation

Conserves cellular morphology of fresh & frozen tissue, compatible with GFP, IF, IHC, ISH and RNAscope imaging

Inactivates viruses, bacteria and yeast*

Allows work in lower biosecurity settings to enable safe, easy transportation of sensitive samples

Tissue Dissociation with vivoPHIX™

Suitable for single-cell multi-omic analysis

Economical Advantages

Store and ship at room temperature, eliminating the need for expensive cold-chain transport

RNAssist: Next Generation Biosample Stabilizers

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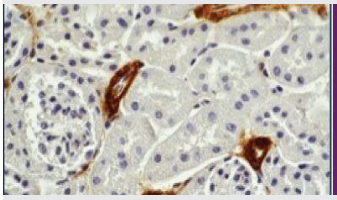
The RNAssist range consists of two products depending on your application:

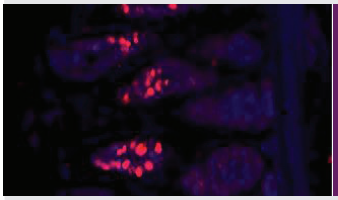
*geno*PHIX™

For projects involving large tissue samples

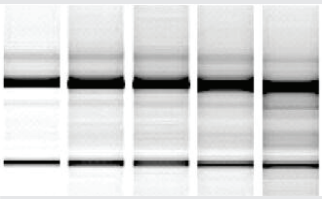
genoPHIX™ has been developed to work with large paraffin-embedded tissue samples. Its unique properties allow genoPHIX™ to extract nucleic acids from paraffin embedded tissue and is ideal for IHC, IF, FISH and fluorescent protein work.



IHC of genoPHIX™ treated kidney section using anti-SMA antibody.



IF of genoPHIX™ treated stomach section using anti-ki67 antibody

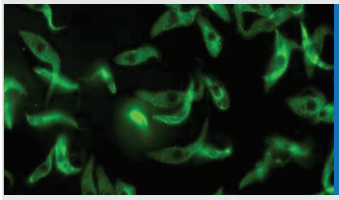


Gel image showing RNA stability over 25 days at 37°C with genoPHIX™

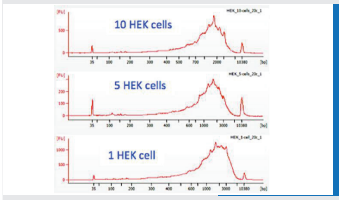
*vivo*PHIX™

For single cell analysis projects

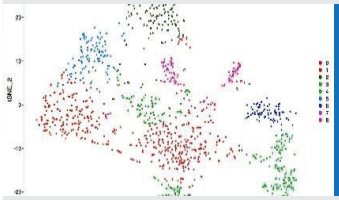
vivoPHIX™ offers the same benefits as genoPHIX™ with the extra advantage of enabling dissociation of biomolecules from tissue for single cell analysis. vivoPHIX™ can therefore be used for downstream single-cell genomic analysis including scRNA-seq and scDNA-seq.



IF of vivoPHIX™ treated trypano-somes using anti-tubulin antibody.



SMART-seq2 analysis of 1,5 or 10 vivoPHIX™ HEK cells after 5 days storage at 4C.



scRNA-seq analysis of vivoPHIX™ dissociated mouse pancreas.

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*Every virus tested so far with RNAssist reagents have been inactivated. Inactivation must be tested internally by the end user. Please contact us to review the full list of viruses and bacteria that have been effectively inactivated with RNAssist reagents. Treatment with RNAssist demonstrated a 3 log knockdown in ***Candida albicans***. For Research Use Only – not to be used in diagnostic procedures. The product is sold with a license for research but not for diagnostic purposes, no liability is accepted if the product is used for such diagnostic purposes where the result is reported to the patient in breach of the Research Use Only license.

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Introducing *virus*PHIX™

Virus Inactivation and RNA Stabilising Transport Medium

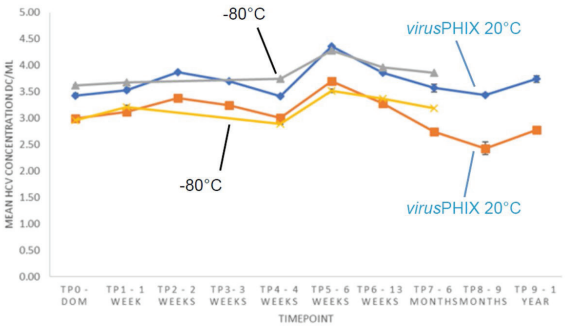
- Stabilises RNA, DNA and phosphoproteins at room temperature
- Inactivates all tested viruses, bacteria and yeast* for safer handling and transport at room temperature
- Compatible with most RNA purification kits (RNeasy™, QIAamp™, QIAsymphony™, QIAcube™, Nuclisens™, GeneXpert™ and Filmarray™) for molecular testing
- Non- toxic, non-volatile guanidine-free formulation

virusPHIX™ is a novel RNA stabiliser and virus inactivation medium based on techn ology developed by Rapid Labs Limited & RNAssist Limited (UK). It has shown to stabilise RNA for up to 1 year at 20 C and has successfully inactivated all tested viruses and bacteria to date. Unlike other virus transport mediums, virusPHIX ™ does not conta in guanidine, a highly toxic substance than can produce hydrogen cyanide when mixed with household cleaning products such as bleach. virusPHIX ™ is a completely non-toxic, non-volatile reagent that can be used safely in a home testing environment and shipped for PCR analysis. The virusPHIX™ range of products are manufactured and sold worldwide by Rapid Labs Limited (UK). With over 200 evaluators around the world, virusPHIX™ is a popular choice for RNA stabilisation thanks to its compatibility with most front end RNA purification kits.

"We have been able to move our dengue research form a CL3 to CL2 facility thanks to virusPHIX™ , improving the safety of our research and daving a lot of time and resources in the process"
- Dr SM, Pasteur Institute, Paris

"We were able to fix our samples on collection in West Africa and safely transport them to Cambridge. Despite delays in the shipping where samples where delayed at Dubai for at least a day at 45°C, nevertheless the samples retained an excellent level of quality.
- Dr VL, Sanger Institute, Cambridge

Viruses/Bacteria Inactivated with virusPHIX™		
SARS-CoV-2	Mtb*	BVDV
Zika	Vaccinia	*Staph. a*
Dengue	FIV	*P. aeruginosa*
Influenza A	Hep B (duck)	Listeria



Qnostics
QCMD
Thanks to Shubana Kazi and Alastair Ricketts

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*virus*PHIX™ Formulations

virusPHIX+™

The original formulation, recommended for Swab and saliva testing

The Roslin Institute in Edinburgh, UK demonstratedthat virusPHIX+™ inactivates SARS - CoV - 2 in as little as 10 minutes when treated at a 1:1 sample to reagent ratio at room temperature. Under these conditions, a 10log6 reduction in SARS - CoV - 2 virus titre was recorded. An additional independent study by Qnostics UK de monstrated that stabilises SARS - CoV - 2 virus RNA for at least 33 days at 20°C. Sputum samples spiked with SARS - CoV - 2 RNA were analysed over 33 days, and the Ct value was compared with virus PHIX+™ treated samples and control (no stabiliser added). An independent UK organisation evaluated the reduction in virus titre SARS - CoV - 2 spiked samples (tissue culture fluid) and presence of SARS - CoV - 2 over a series of cell passages. Reduction in virus titre following treatment is given as the difference between the mean log10 TCID50/ml for treated conditions and the PBS control (Test 1). In parallel, purified samples were seeded onto Vero E6 monolayers to amplify any remaining virus over the course of up to four serial passages. This test is qualitative and reports either the presence or absence of virus amplification (Test 2)

Tratament	Test 1: Reduction in SARS-CoV-2 virus titre	Test 2: Passage
virusPHIX+™, 10 minutes	≥6.4 log10	virus not detected
virusPHIX+™, 30 minutes	≥7.1 log10	virus not detected
PBS Control, 10 minutes	-	virus detected
PBS Control, 30 minutes	-	virus detected

Please contact us if you wish to view the full study reports.

*virus*PHIX-LV™

A lower viscosity formulation, optimised for automated liquid handling platforms (Hamilton, Ortho, Tecan), suitable for testing with nasopharyngeal swab samples.
Independent UK study evaluated the same reduction in virus titre SARS - CoV - 2 spiked samples treated with virusPHIX - LV vs PBS control at a 1:10 ratio (room temperature):

Treatment	Reduction in SARS-CoV-2 virus titre
***virus*PHIX-LV+™, 10 minutes**	≥5.1 log10
virusPHIX-LV+™, 30 minutes	≥6.0 log10
PBS Control	

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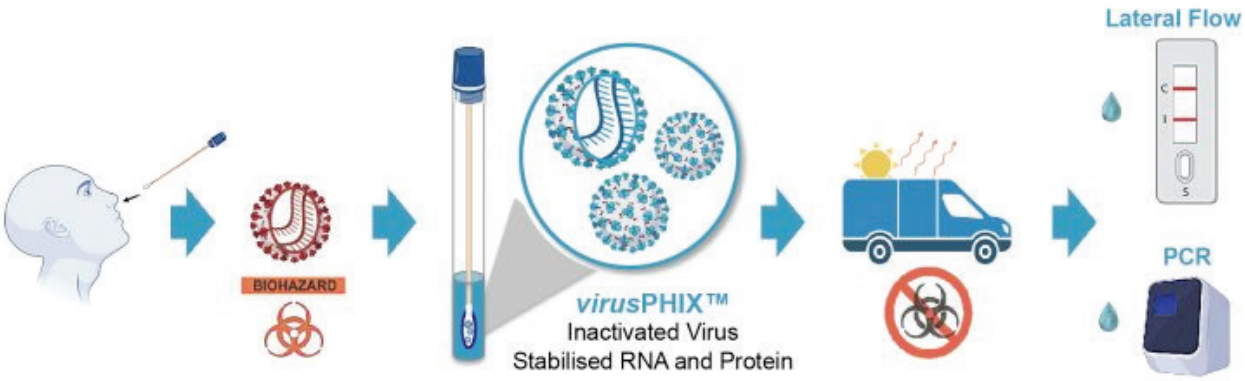
*virus*PHIX-P9™

Recommended as an inactivation and RNA stabilisation media for saliva and swabs, especially when it is necessary to add sample directly into an RT-LAMP, LamPORE or RT-PCR assay without RNA purification*. Extensive testing at QCMD has shown that virusPHIX-P9™ is compatible with a variety of SARS-CoV-2 antigenic tests including a wide range of Latera Flow tests.
The same independent tests were performed using virus PHIX-P9™ to determine SARS-CoV-2 virus titre following 10 minutes and 30 minutes treatment. Samples were diluted in virus PHIX-P9™ at a 1:3 ratio, all other conditions remained the same. Please contact us if you wish to view the full study reports

Treatment	Reduction in SARS-CoV-2 virus titre
***virus*PHIX-P9, 10 minutes**	≥4.4 log10
virusPHIX-P9, 30 minutes	≥4.8 log10
PBS Control	

*virusPHIX-P9™ has been demonstrated to be directly compatible with LAMP assays, please information.



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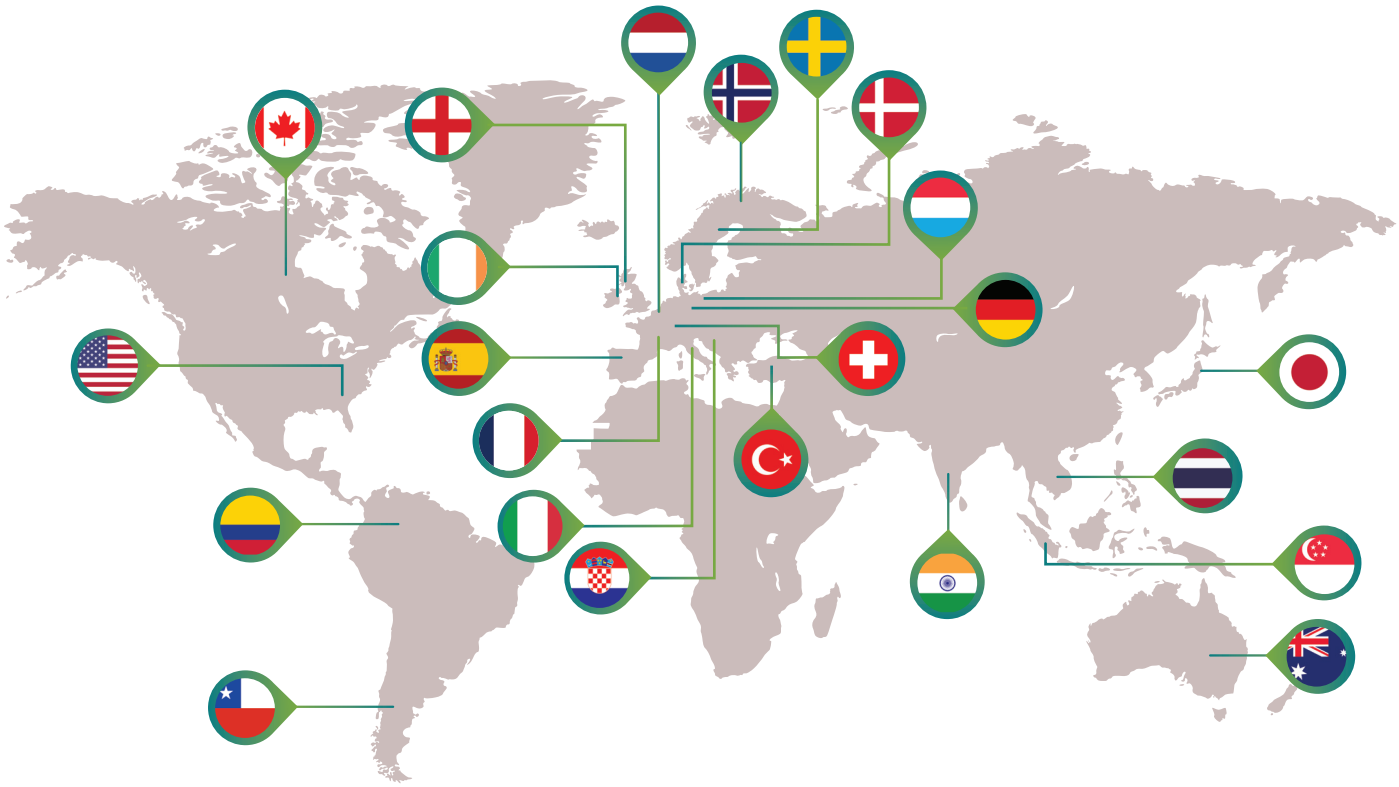
With over 240 users and counting, get in touch now to join the RNAssist community!



AUSTRALIA
University of Western Australia
University of Western Sydney

CANADA
University of Calgary
University of Toronto
Canadian Food Inspection Agency
RNA Diagnostics
St Michael's Hospital

CHILE
FishVet Group

COLOMBIA
National University of Colombia

CROATIA
University of Zagreb

DENMARK
Bioneer

ENGLAND
NIBSC (4)
Qnostics/QCMD
Psioxus
Sanger Institute (28)
University of Cambridge (20)
University of Oxford (14)
Origin Sciences
Cambridge Stem Cell Institute
Oxford Genomics Centre
Public Health England
Cancer Research UK
MRC
GSK
Immunocore
Gurdon Institute

FRANCE
CBMN
Institute Pasteur (16)
IRD
IDvet
ISM
BlueDNA Companion
University Of Bordeaux

GERMANY
Fraunhofer
UKE Hamburg
DZNE
EMBL
Boehringer Ingelheim
ZMT
Advanced Laboratory Solution

INDIA
Oriental Advance Life

IRELAND
University Collage Dublin

ITALY
Sapienza Universita di Roma
Istituto Europeo di Oncologia
Menerini Silicon Biosystems
IIGM-IRCCS
Ospedele San Raffaele

JAPAN
Niigata University

LUXEMBOURG
IBBL

NETHERLANDS
Universitet Utrecht

NORWAY
Universitas Bergensis
EGRU OULU University

SINGAPORE
Nanyang Technological University

SPAIN
Spanish National
Research Council

SWEDEN
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AcouSort

SWITZERLAND
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Novartis
Roche
University of Zurich

THAILAND
Khon Kaen University

TURKEY
Canink Basari Universitesi

UNITED STATES
University of Washington
Unviersity of Chicago
University of Arizona
The Jackson Laboratory
Wayne State
CDC (4)
ACD
UCSF
Genome Sciences U.Wash
Karyologic
MIT (8)
NCI
NWU

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'RNAssist is an amazing technology with important applications for us. I haven't been so excited about something in quite some time.' **– Canadian Food Inspection Agency**

★★★★★

'The FISH signals were better in RNAssist for the three probes I have tested. The big advantage is that we can avoid using the chemical fume hood with RNAssist.' **– University of Cambridge**

★★★★★

'RNAssist is a valid alternative fixative to both preserve tissue morphology and RNA integrity and it is recommended when alcohol-based methods cannot be used to post-fix the tissue' **– European Institute of Oncology**

★★★★★

'I am convinced that we have very good inactivation of the virus' **– Pasteur Institute**

★★★★★

'The RNA quality is very high. The quality was higher than the corresponding methanol fixed tumour' **– University of Oxford**

★★★★★

'Single cell libraries are better with RNAssist. The RNAssist sample is much purer and have more reads per cell. It's working amazingly for my project' **– Sanger Institute**

★★★★★

'This has made clear (as expected) that we need an alternative RNA stabilisation reagent to the one we were using' **– Sanger Institute**

★★★★★

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Overview of vivoPHIX™ and genoPHIX™ workflow for integrated molecular pathology, diagnostics and multi-omics applications

Point of care, lab, field
- Fresh or frozen
- Liquid or solid
- Cell or tissue
- Microbe or human

Inmerse in vivoPHIX™ or genoPHIX™
- One-step
- Easy-to-use
- Non-toxic
- Non-volatile

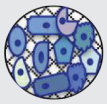
Fixed, stabilised and inactivated sample
- Kills viruses & bacteria
- Fixes cells & tissues
- Stabilizes RNA, DNA and proteins

Optional shipping and storange
- -80 to + 25ºC
- Non-hazardous
- Non-flammable

genoPHIX™
RNA, DNA or protein purification
- Direct interface with commercial kits
- Cleaner preps
- Multianalyte

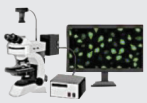
genoPHIX™
Paraffin embedding, staining, IHC, IF, ISH

genoPHIX™
Multi-omics analyses
- Viral diagnostics
- PCR, RT-qPCR
- Metagenomics
- DNAseq, RNAseq
- Western blotting



vivoPHIX™
Tissue Dissociation

vivoPHIX™
Single-cell analyses scRNA-seq, scDNA-seq



genoPHIX™
Histology

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RNAssist FAQ

Frequently Asked Questions Unless otherwise stated, the answers to the below questions apply to both vivoPHIX™ and genoPHIX™ ('RNAssist reagents')

1. **Q:** What sort of samples can be stabilized with RNAssist reagents?
   A: Viruses, bacteria, parasites, animal and plants.

2. **Q:** What volume of reagent to sample is required for biomolecule stabilization?
   A: 20:1 ratio of reagent to solid samples, for liquid biopsies such as whole blood as little as 3:1 reagent to sample.

3. **Q:** What sort of biomolecules are stabilised?
   A: RNA of all types (rRNA, mRNA, tRNA and miRNA), DNA, proteins and phosphoproteins.

4. **Q:** Can I use the genoPHIX™ as a replacement for formaldehyde (eg NBF, formalin)?
   A: Yes, use 20:1 reagent to tissue, allow fixation to occur and then process identically to formaldehyde fixed samples into paraffin and sectioning.

5. **Q:** Are RNAssist reagents reagent toxic or carcinogenic?
   A: No – RNAssist reagents do not need to be used in a chemical fume hood. They do not contain acids, metal salts or alcohol and has a low volatility unless heated above 50°C.

6. **Q:** Do RNAssist reagents form any cross-links?
   A: No, there is no cross-linking or aldehydes present in the reagents, this preserves biomolecule integrity.

7. **Q:** What sort of applications can I use paraffin-embedded genoPHIX™-treated samples for?
   A: All standard staining techniques such as H&E, IHC, IF, ISH and FISH.

8. **Q:** Can I use RNAssist reagents with fluorescent proteins?
   A: Yes, RNAssist reagents are compatible with all tested fluorescent proteins including GFP, RFP and mCherry. Fluorescence is maintained for about 2 hours before dissipating.

9. **Q:** What is the shelf-life and what temperature should I store RNAssist reagents?
   A: 3 years at room temperature.

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RNAssist: Next Generation Biosample Stabilizers

10 **Q:** Does genoPHIX™ stabilise RNA in tissue sections?
A: Yes, unlike FFPE sections, biomolecules are stabilized in sections and can easily be extracted for analysis.

11 **Q:** Q: What applications can I use the stabilized RNA samples for?
A: All applications commonly used in molecular biology including Agilent Bioanalyser and TapeStation, gel electrophoresis, spectrophotometer readings, Northern blotting, RT-PCR, RT-qPCR, RNAseq, scRNA-seq, SMART-seq2, Whole Transcriptome Amplification (WTA), ISH including RNAscope (ACD, USA), nascent transcript FISH.

12 **Q:** What applications can I use the stabilized DNA samples for?
A: All applications commonly used in molecular biology including karyotyping, Agilent Bioanalyser and TapeStation, gel electrophoresis, spectrophotometer readings, Southern blotting, Oxford Nanopore Sequencing, PCR, qPCR, 16S NGS microbial (faecal) analysis, scDNA-seq and FISH.

13 **Q:** What applications can I use the stabilised protein and phosphoprotein samples for?
A: All applications commonly used in a biology lab including gel electrophoresis (PAGE and SDS-PAGE), Western blotting, prion (PrPSC) detection, spectrophotometer readings, Bradford tests, crystallography, protease digestion.

14 **Q:** Can I dissociate animal and human tissues using vivoPHIX™?
A: Yes, there is a novel reliable and efficient protocol for dissociating complex tissues into single-cells for downstream multi-omic applications including scRNA-seq. Please request the protocol.

15 **Q:** Can I use the fixed cells for FACS?
A: Yes, both RNAssist reagents can be used for FACS, including DAPI staining and IF (individual antibodies should be tested on a case-by-case basis).

16 **Q:** Do cells maintain their morphology after fixation with RNAssist reagents?
A: Yes, uniquely fixed individual cells or cells from dissociated tissues preserve their 3D morphological shape aiding identification of different cell types.

17 **Q:** Do I need to freeze my sample after fixation?
A: Short-term preservation is not necessary; however the fixed sample can be stored in a fridge or frozen for longer-term storage and convenience.

18 **Q:** Are fixed samples compatible with my automated RNA purification platform?
A: Yes, both RNAssist reagents are compatible with most purification kits (e.g RNeasy™, QIAsymphony™, QIAcube™, Nuclisens™) are compatible with fixed samples with no modifications to the manufacturer's protocol.

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RNAssist Protocol

1. Add RNAassist reagent to cell tissue sample (20:1 ratio of RNAssist reagent to sample
2. Invert tube 3 times
3. Incubate for at least 20 minutes, depending on sample size and thickness
4. Remove sample from RNAssist reagent
5. Process sample as required (e.g histology, IF, IHC, RNA, DNA, protein analysis/extraction)

RNAssist **PRODUCT RANGE**

Cat. No.	Product Description	Volume
RD-GENO20	genoPHIX™	20ml
RD-GENO-50	genoPHIX™	50ml
RD-VIVO-10X5	vivoPHIX™	5x10ml
RD-VIVO-20	vivoPHIX™	20ml
RD-VIVO-50	vivoPHIX™	50ml

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