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## TECHNICAL DATA SHEET

### PRODUCT SPECIFICATIONS

1	Item	: Aptamer
2	Item Code	: APT-RIZTEF-COV2
3	Target	: SARS-COV Nucleocapsid Protein (N-Protein)
4	Structure	: DNA-based Oligonucleotide
5	Molecular Weight	: 27,200 – 27,600 g/mol
6	Binding Affinity, $K_D$	: 3.5 – 6.2 nM
7	Lowest Detection Achieved	: $1 \times 10^{-14}$ g/mL N-Protein in Buffer
8	Cross Interference	: None detected
9	Functional Group Modification	: Nanogold / Biotin / Thiol / Amine / Carboxyl
10	Stability	: < 35 degC ambient
11	Packaging	: Lyophilized desalted in dry sealed tube
12	Quantity per tube	: 60 – 80 nmol (1.50 – 2.00 mg)
13	Preparation	: Potassium Phosphate Buffer
14	Storage, lyophilized (>6 mths)	: 4 – 20 degC
15	Storage, buffer (<6 mths)	: 4 degC

### SUPPORTING LITERATURE

(i)	Advances in aptamers-based lateral flow assays, October 2017, DOI: 10.1016/j.trac.2017.10.010
(ii)	Development of Aptamer-Based Lateral Flow Assay Methods: Affinity Acquisition and Method Design, October 2018, DOI: 10.1002/9783527806799
(iii)	Application of Aptamers in Virus Detection and Antiviral Therapy, July 2019, DOI: 10.3389/fmicb.2019.01462

## FAQs

1. What are **aptamers**?

*Aptamers are single strands of DNA or RNA oligonucleotides that can fold naturally into three-dimensional shapes that fits and binds selectively into specific target molecules such as proteins and macromolecules. The folding shapes of these aptamers depends on the specific sequence of A, C, G and T of the oligonucleotides.*

2. How are **aptamers** created?

*Conventional method to 'create' aptamers are based on a tedious iterative process called SELEX that combines several cycles of matching, washing and amplifying a library of random sequences of oligonucleotides to the target molecule. At Biogenes, we deploy and combine both the advantages of SELEX and in silico methods to come up with aptamers in more precise and faster way.*

3. How different are **aptamers** from antibodies?

*Aptamers are oligo-based consisting of sugar-phosphate backbone and the four nucleotides, while antibodies are protein-based. Typical lengths of aptamers are between 30 – 100 mers, making them much smaller and versatile than antibodies.*

4. How are **aptamers** better than antibodies?

*The design of aptamers towards target molecules are more precise than antibodies as the process is chemistry-based rather than organism-based. The design and subsequent production of aptamers do not harm any animals, making it a viable option for diagnostic companies that practices high standards in animal ethics.*

5. What are the benefits in using **aptamers** in lateral flow assay?

*Aptamers being oligo-based, can be chemically synthesized with perfect batch-to-batch consistency, therefore ensuring quality of the diagnostic products. Companies also have the option to produce the aptamers in-house, hence reducing dependency on suppliers of antibodies especially from other countries.*

6. Why are **aptamers** not used in lateral flow assay till date?

*There has been much research already being done on the use and lab validation of aptamers on lateral flow assays from various diseases and pathogens. Nevertheless, manufacturers of diagnostic products typically do not like to change their production processes and materials. However, the COVID-19 pandemic has resulted in the sudden surge in the demand for antibodies resulting in insufficient supply and inconsistency in quality. Aptamer is now the better choice for manufacturers to better control their raw materials and production resources.*

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7. How can we switch from antibody-based LFA to **aptamer**-based LFA?

*The switch to aptamer-based LFA is easy as the aptamers can be attached with functional groups that replicate the behavior of antibodies. For example, aptamers can be attached with thiol group for conjugation onto nanogold particles. Manufacturers may need to perform some optimization in order to obtain the same specifications as the original antibody-based LFA.*

8. How are Biogenes **aptamers** different?

*At Biogenes, we combine both lab-based SELEX and in silico design to obtain the right aptamers for our target molecules. This combination allows us to rapidly optimise our aptamer design and speed up the lab-to-market pipeline for all our aptamers.*