

Alvedia
Alice Veterinary Diagnostic



SCIENTIFIC INFORMATION

Why is blood typing so important in canine & feline species ?

Blood typing in dogs and cats is just as important as it is in humans for a variety of medical reasons, especially when it comes to transfusions. Here are some of the main reasons why blood typing is important:

Preventing Transfusion Reactions: Like humans, dogs and cats have different blood types. If a dog or cat receives the wrong type of blood, it can cause a serious and potentially fatal transfusion reaction. This reaction occurs when the recipient's immune system recognizes the donated blood as foreign and attacks it.

Multiple Blood Types: Dogs have more than one blood type, but the most common system classifies canine blood into DEA (dog erythrocyte antigen) groups. The most important of these is DEA 1, which can be positive (DEA1+) or negative (DEA1-).

In cats, the major feline blood group system is the feline AB blood group system with 3 types: A, B, and AB (rare)

Severe Reactions: Cats with type B blood have naturally occurring high titer anti-A antibodies. This means that giving type B blood to a type A cat, even for the first time, can cause a severe and immediate transfusion reaction that can be fatal. Conversely, type A cats have low titer anti-B antibodies, which means that giving type B blood to a type A cat can still cause a transfusion reaction, although it may be less immediate.



MAJOR SCIENTIFIC STRENGTHS OF ALVEDIA BLOOD TYPING TECHNOLOGY

1/ RELIABLE IN CASE OF AUTO-AGGLUTINATION

Thanks to our specific technology, the agglutinated RBCs will be retained at the bottom of the membrane.

Agglutinated RBCs

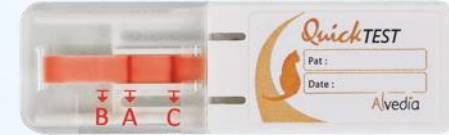


2/ RELIABLE IN CASE OF LOW PCV (ANEMIA) FOR CANINE AND FELINE

Thanks to the sensitivity of our anti-A and Anti-B monoclonal antibodies, blood typing is reliable even with a very low PCV.



10% PCV



5% PCV



3/ RELIABLE IN CASE OF WEAK DEA1 POSITIVE DOGS

Thanks to the specificity of our DEA1 monoclonal antibody, we are able to detect the entire range of DEA1 antigen. (previously typed DEA1.2 and DEA1.3)



2011: PUBLICATION OF THE ALVEDIA FELINE BLOOD TYPING TECHNOLOGY

CHROM Kit = Alvedia Blood Typing Strip Technology
CA Test = Card Agglutination (competitors)

KEY POINTS TO REMEMBER

CHROM kit (ALVEDIA test) :

- 95% agreement with the tube method
- 100% specific for detection of the A antigen and 97,7% for B
- Easy to read and interpret
- Result archivable
- More simple to use

Card Agglutination (Competitors) :

- 91% agreement with the tube method
- 93,3% specific for detection of the B antigen
- Result non archivable

Comparison of five blood-typing methods for the feline AB blood group system

Mayank Seth, BVetMed, Karen V. Jackson, BVSc, and Urs Giger, Dr med vet, MS
Section of Medical Genetics, School of Veterinary Medicine, University of Pennsylvania,
Philadelphia, PA 19104



Am J Vet Res 2011

« The CHROM kit would appear to be the simplest to use, with the least subjective result interpretation in a clinic environment »

2012: PUBLICATION OF THE ALVEDIA CANINE DEA1 BLOOD TYPING TECHNOLOGY

Cartridge ICS = Alvedia Blood Typing Strip Technology
CA Test = Card Agglutination (competitors)

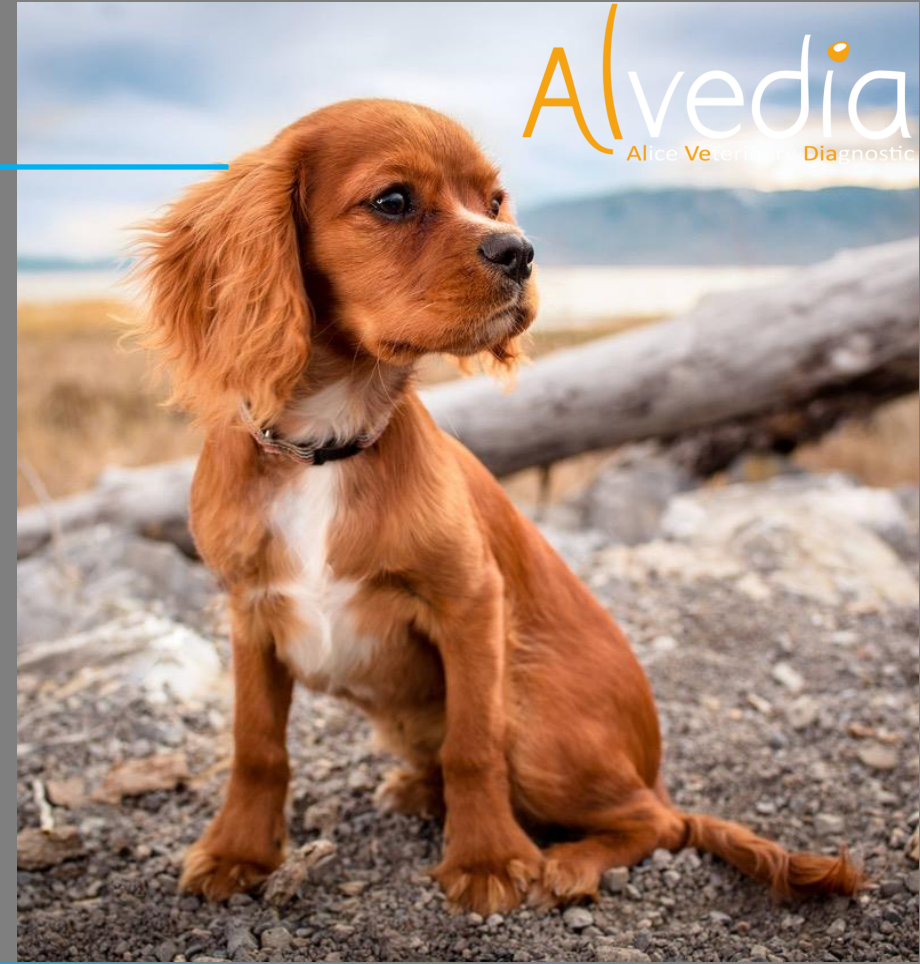
KEY POINTS TO REMEMBER

Immunochromatographic Cartridge ICS (ALVEDIA test) :

- 100% specific for detection of DEA1 antigen
- Easy to interpret
- Suitable and safe for use in the screening of patients in emergency situations
- In the presence of persistent autoagglutination, DEA1 typing was possible with ICS cartridge

Card Agglutination (Competitors) :

- 89% to 91% accurate depending on interpretation
- Sensitive for the detection of DEA1.1 but there are subjectivity in test interpretation
- Distinction between negative and 1+ results are difficult to interpret
- DEA1.1 typing is not reliable in the presence of persistent autoagglutination



Comparison of gel column, card, and cartridge techniques for dog erythrocyte antigen 1.1 blood typing

Mayank Seth, BVetMed; Karen V. Jackson, BVSc; Sarah Winzelberg, VMD; Urs Giger, PD, Dr med vet, MS

Am J Vet Res 2012

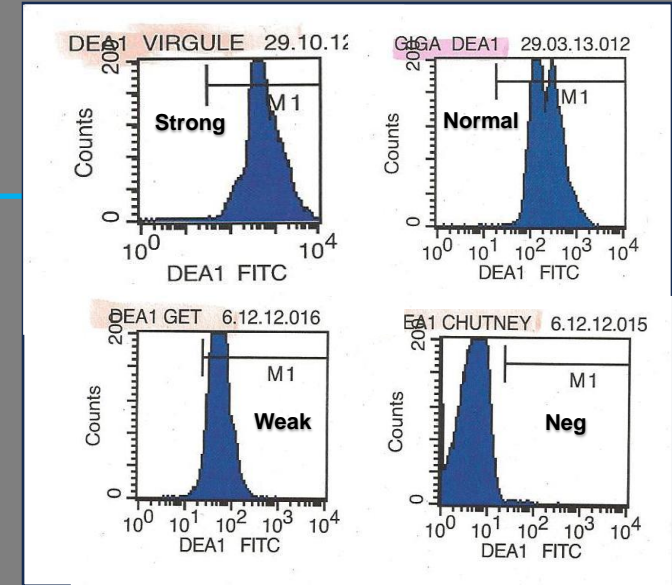
« The immunochromatographic cartridge method may have an advantage of allowing typing of samples with persistent autoagglutination »

2014: PUBLICATION ON DEA 1 EXPRESSION STUDY

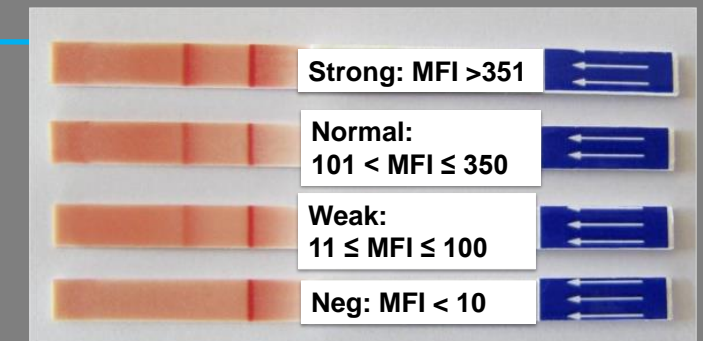
New classification system on DEA1.1 and DEA1.2 positive dogs

KEY POINTS TO REMEMBER

- Significant correlation between test results from both methods (Alvedia Strip Technology & Flow Cytometric Techniques)
- Complete agreement between the strip and the flow to classify dogs as DEA1+ and DEA1-
- Previously typed DEA1.2+ appeared to be DEA1+ with a low level of antigen expression (similar to human rhesus system)
- To avoid incompatible transfusions, it is clinically important to detect weak DEA1 positive dogs
- Our specific DEA1 monoclonal antibody is able to detect all range of DEA1 intensities thanks to its specificity



DEA1 results obtained with Flow cytometry analysis
Perfect correlation with Alvedia strip technology



DEA1 results obtained with Alvedia strip technology
Perfect correlation between MFI and strip intensity
MFI = Mean Fluorescence Intensity

DEA 1 Expression on Dog Erythrocytes Analyzed by Immunochematographic and Flow Cytometric Techniques

M.M. Acierno, K. Raj, and U. Giger

J Vet Intern Med 2014

« The blood group system DEA 1 is a continuum from negative to strongly positive antigen expression. Previously typed DEA 1.2+ appears to be DEA 1+.»

2015: PUBLICATION OF THE ALVEDIA FELINE BLOOD TYPING TECHNOLOGY

IC technique = Alvedia Strip Technology
CA Test = Card Agglutination (competitors)

KEY POINTS TO REMEMBER

Immunochromatographic Cartridge (ALVEDIA test) :

- Specificity, sensitivity, positive predictive value, and negative predictive value of 100% in detecting feline blood types A, B, and AB
- The reproducibility of the IC results was excellent
- The IC test is reliable with autoagglutinated samples
- Low volume of 10 μ L sample needed versus competitors with 150 μ L
- Result in only 2 minutes versus 10 minutes with competitors
- The IC blood type can be used in samples that have been refrigerated or store at room temperature for weeks
- The 5 hemolyzed specimens and 3 autoagglutinated specimens were correctly typed with IC tests
- The IC test can be used with typical anticoagulants and preservative solution

Evaluation of an immunochromatographic test for feline AB system blood typing

Eva Spada, DVM, PhD; Daniela Proverbio, DVM, PhD; Luciana Baggiani, DVM; Giada Bagnagatti De Giorgi, DVM, PhD; Roberta Perego, DVM, PhD and Elisabetta Ferro, DVM



J Vet Emerg Crit Care 2015

« The IC technique is an accurate assay for the identification of A, B, and AB blood types in anemic and nonanemic feline blood. It has a higher sensitivity and specificity than the CA test. »

2019: PUBLICATION OF THE ALVEDIA CANINE DEA1 BLOOD TYPING TECHNOLOGY

IC test = Alvedia Strip Technology
CA Test = Card Agglutination (competitors)

KEY POINTS TO REMEMBER

- The IC Test was used as a reference method based on results of previous studies that shown 100% agreement with gel column
- Using the CA Test, a lack of specificity associated with weak agglutination reactions was observed
- The differentiation of the degree of agglutination for the CA test requires a certain amount of experience
- The results of the CA tests are subjective and variable
- Overall reliability of the CA method appeared lower than that of the IC test.



Received: 6 October 2017 | Revised: 19 January 2019 | Accepted: 27 February 2019
DOI: 10.1111/vcp.12788

BRIEF COMMUNICATION

Veterinary Clinical Pathology
An International Journal of Laboratory Medicine WILEY

The card agglutination test for dog erythrocyte antigen 1 (DEA 1) blood typing in donor dogs: Determining an appropriate cutoff to detect positivity using a receiver operating characteristic curve

Daniela Proverbio  | Roberta Perego  | Luciana Baggiani | Eva Spada 



2019: PUBLICATION IN ANIMAL TRANSFUSION OF ALVEDIA FELINE AND CANINE BLOOD TYPING TECHNOLOGY

IC technique = Alvedia Strip Technology
CA Test = Card Agglutination (competitors)

KEY POINTS TO REMEMBER

Immunochromatographic Cartridge (ALVEDIA test) :

- 100% specific for DEA1 detection and feline A blood type
- No false DEA1 positive dogs
- The test is less affected by autoagglutination

Card Agglutination (Competitors) :

- Interpretation of results may be confused with autoagglutination
- Must be interpreted immediately
- Lowest accuracy (91,4%) in comparison to ICS blood typing



Transfusion Medicine: An Update on Antigens, Antibodies and Serologic Testing in Dogs and Cats

Rebecca Zaremba, DVM^{a,b,*}, Aimee Brooks, DVM, MS, DACVECC^{a,b},
Elizabeth Thomovsky, DVM, MS, DACVECC^{a,b}

Topics in Companion An Med 2019

« This review presents the basic immunology of pretransfusion testing, including methodologies of blood typing and crossmatch testing, and their application in canine and feline medicine. »

2021: OVERVIEW IN FELINE TRANSFUSION

QuickTest A+B = Alvedia Feline Technology for A+B blood typing
Rapid Vet-H : DMS Laboratories (Competitors)

KEY POINTS TO REMEMBER

- In clinic Alvedia QuickTest A+B performed slightly better than the RapidVet-H card test agglutination
- Alvedia technology is more reliable in cats with autoagglutination
- Alvedia QuickTest A+B performed well on blood that had been stored in the fridge and at room temperature
- Alvedia QuickTest A+B uses monoclonal antibodies to differentiate the blood antigens
- RapidVet-H cards use a lectin from *Triticum vulgare* as the anti-B reagent which is less specific



2021 ISFM Consensus Guidelines on the Collection and Administration of Blood and Blood Products in Cats

Alvedia
Alice Veterinary Diagnostic

Journal of Feline Medicine and Surgery 2021

« These Guidelines have been created by a panel of authors convened by the International Society of Feline Medicine (ISFM), based on available literature. »

SOME OTHER PUBLICATIONS TALKING ABOUT ALVEDIA BLOOD TYPING TECHNOLOGY

Assessment of feline blood for transfusion purposes in the Dublin area of Ireland

F. Juvet, S. Brennan, C. T. Mooney

Vet Rec. 2011

Research Article

Prevalence of Dog Erythrocyte Antigen 1 in 7,414 Dogs in Italy

Anyela Andrea Medina Valentin, Alessandra Gavazza, and George Lubas

Vet Med Int. 2017

RESEARCH ARTICLE

Open Access

Prevalence of *Dal* blood type and dog erythrocyte antigens (DEA) 1, 4, and 7 in canine blood donors in Italy and Spain

Daniela Proverbio^{1*}, George Lubas², Eva Spada¹, Anyela Andrea Medina Valentin², Luis Miguel Viñals Florez³, Maria del Rosario Perlado Chamizo⁴, Roberta Perego¹, Maria Grazia Pennisi⁵, Elisabetta Ferro⁶, Luciana Baggiani¹, Alessandra Gavazza⁷ and Marie-Claude Blais⁸

BMC Vet Res. 2020



RESEARCH ARTICLE

Open Access

Frequency of DEA 1 antigen in 1037 mongrel and PUREBREED dogs in ITALY

E. Carli^{1*}, A. Carminato², S. Ravagnan¹, K. Capello¹, M. T. Antognoni³, A. Miglio³, T. Furlanello⁴, D. Proverbio⁵, E. Spada⁵, A. Stefani¹, F. Mutinelli¹ and M. Vascellari¹

BMC Vet Res. 2017




Prevalence of dog erythrocyte antigen 1.1 in galgos (Spanish greyhounds)

I. Mesa-Sanchez, R. Ruiz de Gopegui-Fernández, M. M. Granados-Machuca, A. Galan-Rodriguez

Vet Rec. 2014

SOME OTHER PUBLICATIONS TALKING ABOUT ALVEDIA BLOOD TYPING TECHNOLOGY

Prevalence of naturally occurring non-AB blood type incompatibilities in cats and influence of crossmatch on transfusion outcomes

Megan E. McClosky¹ | Dorothy Cimino Brown^{1#} | Nicole M. Weinstein² | Nicole Chappini² | Michael T. Taney^{1#} | Kimberly Marryott¹ | Mary Beth Callan¹ 

JVIM 2018

Prospective evaluation of the utility of cross-matching prior to first transfusion in cats: 101 cases

K. R. HUMM^{1*} AND D. L. CHAN^{*}




JSAP 2020

Prevalence of dog erythrocyte antigens 1 and 7 in eleven canine breeds in the Republic of Korea

Seung-Won Yi^{1†}, Eunju Kim^{1†}, Sang-Ik Oh¹, Seok Il Oh², Jong Seok Kim², Ji-Hong Ha³, Bugeun Lee³, Jae Gyu Yoo¹, Yoon Jung Do^{1*}

KJVS 2022

Detection of naturally occurring alloantibody by an in-clinic antiglobulin-enhanced and standard crossmatch gel column test in non-transfused domestic shorthair cats

Isabelle Goy-Thollot¹  | Alexandra Nectoux¹ | Maryline Guidetti² | Benjamin Chaprier² | Sarah Bourgeois² | Catherine Boisvineau¹ | Anthony Barthélemy¹  | Céline Pouzot-Nevoiret¹ | Urs Giger³ 

JVIM 2018

Survey of Blood Groups *DEA 1, DEA 4, DEA 5, Dal, and Kai 1/Kai 2* in Different Canine Breeds From a Diagnostic Laboratory in Germany

Anne K. Ebel¹, Sonja Fuchs¹, Corinna Weber¹, Elisabeth Müller¹ and Urs Giger^{2*}

¹ Laboklin GmbH&Co KG, Kissinger, Germany; ² PennGen Laboratory, University of Pennsylvania, Philadelphia, PA, United States

Frontieres in Vet Sc. 2020

ACCORDING TO THE LITERATURE, WHAT IS THE MOST IMPORTANT THING TO REMEMBER ABOUT THE ALVEDIA'S BLOOD TYPING TECHNOLOGY?



1. **Rapid Results:** Alvedia technology is a quick method that provides results in minutes.
2. **Ease of Use:** Alvedia tests are typically user-friendly, not requiring extensive training and no equipment needed.
3. **Portability:** Alvedia tests are portable, allowing blood typing to be performed in various complicated settings such as emergencies.
4. **Sensitivity and Specificity:** Alvedia Immunochromatographic method is highly sensitive and specific, leading to accurate results.
5. **Reproducibility:** Alvedia immunochromatographic method is extremely reproducible due to the high specificity of our monoclonal antibodies and the high quality standard of the production process.
6. **Archivable results:** Alvedia Immunochromatographic tests can be stored for years to ensure traceability. In addition, you can send yourself a detailed report using the special alvedia mobile app.



TECHNOLOGY

- Immuno-chromatography
- User-friendly procedure (no training)
- Reliable in case of auto-agglutination
- Reliable in case of low PCV
- Archivable results
- Only 10ul of blood is needed
- Hematocrit adjustment is not required

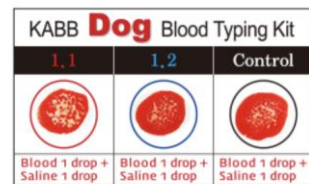
CANINE

- Detects weak DEA1 antigens (from weak to strong reaction)
- High specificity compared to Flow cytometry

FELINE

- Reliable to detect AB blood groups
- High specificity compared with genotyping

COMPETITORS




- Agglutination reaction
- End users needs to be trained
- NOT reliable in case of auto-agglutination
- NOT reliable in case of low PCV
- NOT archivable (agglutination reaction)
- Requires 100ul of blood (Zoetis)
- Need to adjust hematocrit (Zoetis)

- Does NOT detect weak DEA1 antigens
- Detection of DEA1.1 antigen only (Zoetis)
- Low specificity compared to Flow cytometry

- Does not correctly detect AB blood types.
- Low specificity on AB and B blood groups

HIGH STANDARD MANUFACTURING

SCIENTIFIC EXPERTISE : CELL CULTURE PRODUCTION OF ANY MONOCLONAL ANTIBODY AND QUALITY CONTROLS



The great strength of our company lies in the fact that we have our own scientific team specialized in cell culture. As a result, we have developed specific monoclonal antibodies for each antigen and species. This means that we control the entire production chain for our tests, from the monoclonal antibodies to the final packaging.

Our laboratories and production facilities are located in Limonest, France. All our production is carried out in-house in France by a permanent team of trained and experienced employees.

Quality control of each batch of reagents is applied to ensure the specificity, stability and robustness of each monoclonal antibody. Each batch has a specific lot number that is tracked throughout the manufacturing process. All our monoclonal antibodies are tested using flow cytometry analysis to ensure the best specificity and calibration between batches.

PRODUCTION : DISPENSING MONOCLONAL ANTIBODIES ON THE STRIP

TO ENSURE THE RELIABILITY OF THE TEST, OUR PRODUCTION UNIT ALWAYS STARTS THE DISPENSING PROCESS BY TESTING THE FIRST STRIPS:

1. SPECIFICITY OF THE PRODUCT

For each batch, we test the specificity of the product with known positive and negative controls.

Example of production of the Canine Blood Typing product:

Our scientific team will ask the production manager to submit the first strips for testing before launching the entire production.

They will test the specificity first: multiple DEA1 positive samples must show a strong line on the membrane.

Multiple DEA1 negative samples must remain negative in front of DEA1 on the membrane. The line must remain negative even after hours to verify that NO weak (or faint) line will appear after drying in order to avoid a false positive result.

Multiple Weak positive DEA1 samples are used and must show a weak line in front of DEA1 on the membrane.

2. ROBUSTNESS OF THE PRODUCT

Using flow cytometry analysis, we will ensure that the intensity of the DEA1 line correlates with the level of expression of the DEA1 antigen.

A low intensity level should indicate a weak line in front of the DEA1 line, and a high intensity level should indicate a strong line in front of the DEA1 line.

After passing these quality controls (specificity and robustness), the entire production is released with a unique batch number (LOT N° on the product label) and must continue to stability testing before the final control.



DISPENSING MONOCLONAL ANTIBODIES ON THE STRIP

OUR PRODUCTION UNIT WILL ALWAYS START THE DISPENSE BY TESTING THE FIRST STRIPS TO ENSURE THE RELIABILITY OF THE TEST.

3. MIGRATION OF RED BLOOD CELLS

Our Immuno-chromatography technology is reliable using whole blood or packed red blood cells.

We perform quality control of the membrane in order to ensure that the Red Blood Cells will migrate correctly all along the entire strip.

We calculate the migration time from the bottom of the strip to the top and we accept a range of 2 minutes to 5 minutes.

4. STABILITY TESTING

At the end of the production process, several strips (beginning, middle and end of production) are sent for stability testing.

We « stress » the products by increasing the temperature and humidity rate for several days. The antibodies must remain stable throughout this process to ensure a long-term stability.

After passing the stability test, the entire production is released for final packaging.

A total of 5% of our production is stored at room temperature in both types of packaging (aluminum foil and silica tubes) for long-term stability.



5. PRODUCT ASSEMBLY

We follow a step-by-step process to ensure that all devices are properly included in the final packaging. We have implemented quality control at every step of the production process. One of the main purposes is to focus on traceability procedures.



6. FINAL PACKAGING PROCESS

All our Immuno-Chromatography products can be stored at room temperature due to our high quality packaging standards.



7. LONG TERM STABILITY

Our scientific team is dedicated to providing a product that is reliable throughout the shelf life of the product.

In order to anticipate potential problems, our scientific team tests ALL of our batches currently on the market EVERY 3 months.

If a problem occurs, we are able to recall only the affected lot and replace it with a new product.



How to combine high-tech scientific products with the power of AI ?

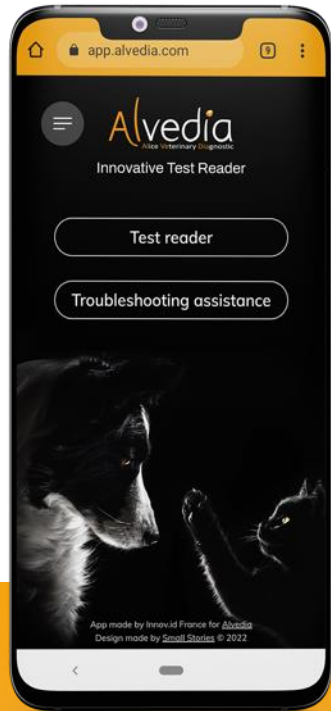


Scan the QR CODE
to open the app

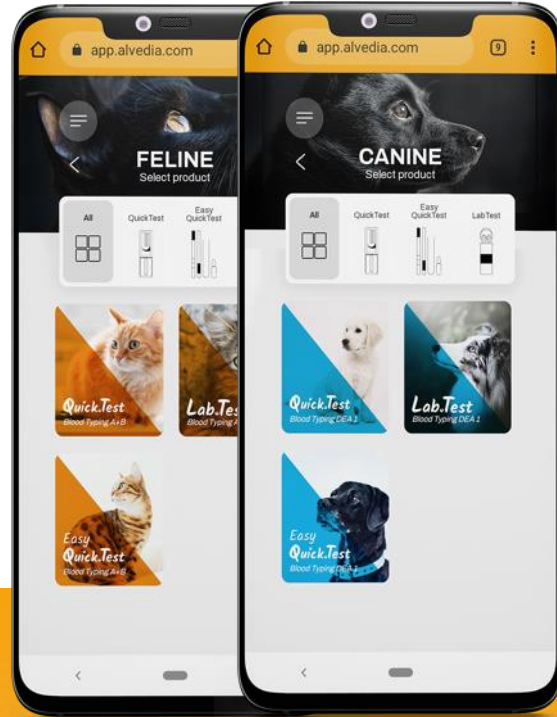


www.app.alvedia.com

ADVANTAGES OF OUR NEW APP



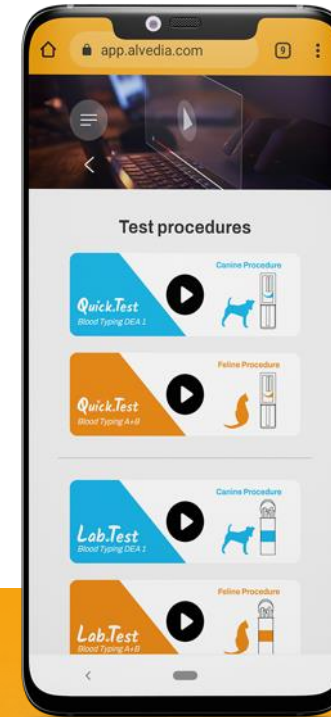
**FREE APP AVAILABLE
ON ALL MOBILE
PHONES**



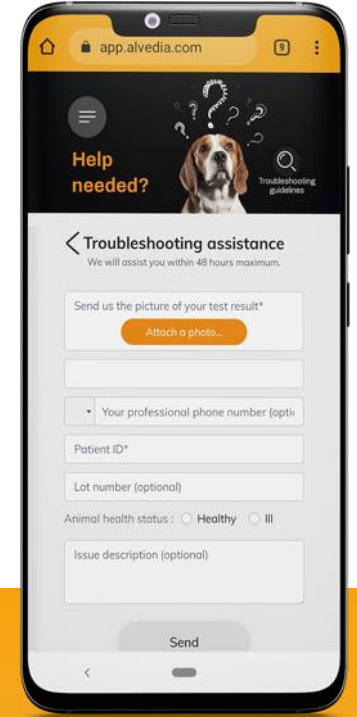
**ARCHIVABLE RESULTS WITH
PDF REPORT BY EMAIL**



**INSTANT RESULT USING
AI AND OPERATOR
CONFIRMATION**



**MOVIE PROCEDURE
HELPFUL IN ANY
LANGUAGES**



**SCIENTIFIC
ASSISTANCE WITHIN
24 HOURS**

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