Welcome to the era of
MOLECULAR ALLERGY for animals!

PAX
pet allergy xplorer

POWERED BY MADX TECHNOLOGY
MACRO ARRAY DIAGNOSTICS

First quantitative macroarray IgE test specifically designed for animals

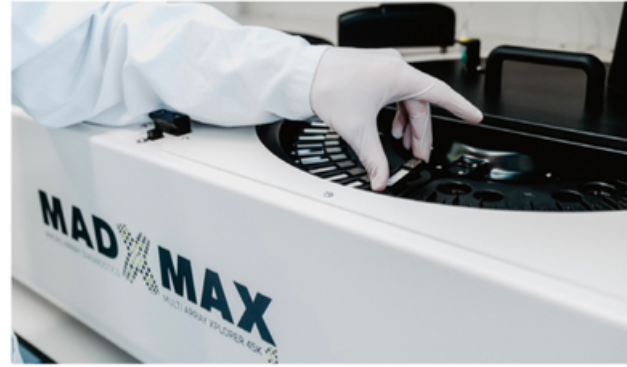**Over 200 allergen extracts and molecular components**

Better identification of allergen cross-reactivities

Fully automated process, higher level of standardisation

With CCD blocking and 2 blocking efficiency detectors

nextmune

Molecular Allergology:
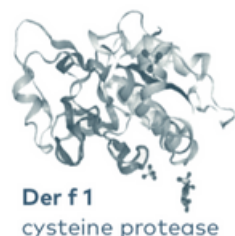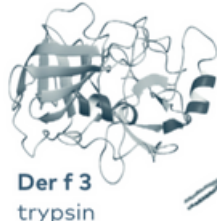# The future of IgE sensitisation detection

Molecular allergology is a state-of-the-art approach to the detection of sensitisations, whereby defined single allergen components are used for the determination of specific IgE in place of traditionally-used allergen extracts. The molecular components are recombinant proteins that provide a higher level of standardisation than allergen extracts and enable a more precise identification of IgE sensitisations. Molecular allergology tests are powerful tools that help pinpoint allergy triggers, thus facilitating risk assessment and therapy decisions.

Nextmune is bringing you the first molecular allergology platform for animals, the next-generation in allergen-specific IgE serology.
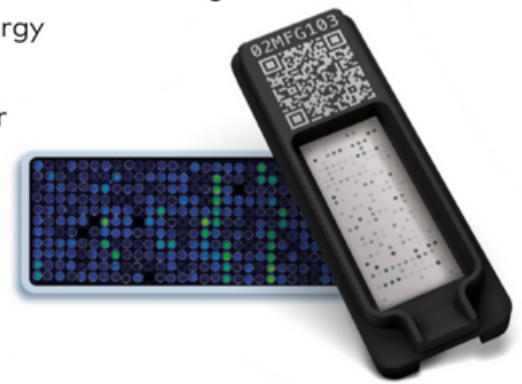
What are the main advantages of PAX?

- First quantitative multiplex macroarray specifically designed for companion animals

- Over 200 allergen extracts and components included = lower testing cost per allergen

- Fully automated process = higher level of standardization (same result if tested multiple times)

- With CCD blocking and 2 blocking efficiency detectors

- Only 0.5 ml of serum needed

- Expected increase in serological test sensitivity due to a higher concentration of molecular allergens

- Identification of "primary" sensitizing allergens

- Identification of allergen cross-reactivities

- Selection of relevant allergens for specific immunotherapy

Allergen extract	Der f 2 NPC2 family	Der f 3 trypsin	Der f 10 tropomyosin	Der f 15 chitinase	Der f 1 cysteine protease

Molecular Allergology: The era of individual components

Grass Pollens

Common name	Scientific name	Extracts & Components
Bermuda grass	Cynodon dactylon	Cyn d *
		rCyn d 1
Orchard grass	Dactylis glomerata	Dac g *
Meadow fescue	Festuca pratensis	Fes p *
Perennial ryegrass	Lolium perenne	rLol p 1
Timothy	Phleum pratense	rPhl p 1
		rPhl p 2
		rPhl p 5.0101
		rPhl p 6
		rPhl p 7
		rPhl p 12
Kentucky blue grass	Poa pratensis	Poa p *
Ryegrass, cultivated	Secale cereale	Sec c_pollen *

Tree Pollens

Common name	Scientific name	Extracts & Components
Alder	Alnus glutinosa	Aln g *
		rAln g 1
		rAln g 4
Silver birch	Betula verrucosa	Bet v *
		rBet v 1
		rBet v 2
		rBet v 6
Hazel	Corylus avellana	Cor a_pollen *
		rCor a 1.0103
Cypress	Cupressus sempervirens	Cup s *
Beech	Fagus sylvatica	rFag s 1
Ash	Fraxinus excelsior	Fra e *
		rFra e 1
Privet	Ligustrum vulgare	Lig v *
Olive tree	Olea Europaea	Ole e *
		nOle e 1
		rOle e 7
		rOle e 9
London plane tree	Platanus acerifolia	rPla a 1
		nPla a 2
		rPla a 3
Cottonwood	Populus nigra	Pop n *
Elm	Ulmus campestris	Ulm c *

Weed Pollens

Common name	Scientific name	Extracts & Components
Ragweed	Ambrosia artemisiifolia	Amb a *
		rAmb a 1
		rAmb a 4
Mugwort	Artemisia vulgaris	Art v *
		rArt v 1.0101
		rArt v 3.0201
Lamb's quarter	Chenopodium album	Che a *
		rChe a 1
Wall pellitory	Parietaria judaica	Par j *
		rPar j 2
Ribwort / Plantain	Plantago lanceolata	Pla l *
		rPla l 1
Dock/Sorrel	Rumex crispus / acetosella	Rum c / * Rum a
Russian thistle	Salsola kali	Sal k *
		rSal k 1
Nettle	Urtica dioica	Urt d *

Danders & Epithelia

Common name	Scientific name	Extracts & Components
Cattle	Bos domesticus	rBos d 2
Dog	Canis familiaris	rCan f 1
		rCan f 2
		nCan f 3
		rCan f 4
		rCan f 6
		Can f_maleurine (including Can f 5) *
		rCan f Fel d 1 like
Guinea pig	Cavia porcellus	rCav p 1
Horse	Equus caballus	rEqu c 1
		nEqu c 3
		rEqu c 4
Cat	Felis domesticu	rFel d 1
		nFel d 2
		rFel d 4
		rFel d 7
Mouse	Mus musculus	rMus m 1
Rabbit	Oryctolagus cuniculus	rOry c 1
		rOry c 2
		rOry c 3

Mites & Cockroaches

Common name	Scientific name	Extracts & Components
Acarus siro	Acarus siro	Aca s *
German cockroach	Blatella germanica	rBla g 1
		rBla g 2
		rBla g 4
		rBla g 5
		rBla g 9
Flea	Ctenocephalides felis	Cte f 1
Dermatophagoides farinae	Dermatophagoides farinae	Der f *
		rDer f 1
		rDer f 2
		rDer f 15
		rDer f 18
Dermatophagoides pteronyssinus	Dermatophagoides pteronyssinus	Der p *
		rDer p 1
		rDer p 2
		rDer p 5
		rDer p 7
		rDer p 10
		rDer p 11
		rDer p 20
		rDer p 21
		rDer p 23
Glycyphagus domesticus	Glycyphagus domesticus	rGly d 2
Lepidoglyphus destructor	Lepidoglyphus destructor	Lep d *
	Lepidoglyphus destructor	rLep d 2
Tyrophagus putrescentiae	Tyrophagus putrescentiae	Tyr p *
	Tyrophagus putrescentiae	rTyr p 2
Alternaria alternata	Alternaria alternata	Alt a *
		rAlt a 1
		rAlt a 6

Moulds & Yeasts

Common name	Scientific name	Extracts & Components
Aspergillus fumigatus	Aspergillus fumigatus	Asp f *
		rAsp f 1
		rAsp f 3
		rAsp f 4
		rAsp f 6
Cladosporium herbarum	Cladosporium herbarum	Cla h *
		rCla h 8
Malassezia pachydermatis	Malassezia pachydermatis	Mala p *
Malassezia sympodialis	Malassezia sympodialis	rMala s 1
		rMala s 9
		rMala s 5
		rMala s 6
		rMala s 11

Insect Venoms

Common name	Scientific name	Extracts & Components
Honey bee venom	Apis mellifera	Api m *
		nApi m 1
		Api m 2
		Api m 3
		Api m 5
		rApi m 10
Long-headed wasp venom	Dolichovespula spp.	Dol spp *
Paper wasp venom	Polistes dominulus	Pol d *
		rPol d 5
Fire ant venom	Solenopsis richteri & Solenopsis invicta	Sol spp *
Common wasp venom	Vespula vulgaris	Ves v *
		rVes v 1
		rVes v 5

Foods

Common name	Scientific name	Extracts & Components
Oat	Avena sativa	Ave s *
Buckwheat	Fagopyrum esculentum	Fag e *
		nFag e 2
Sunflower seed	Helianthus annuus	Hel a *
Barley	Hordeum vulgare	Hor v *
Rice	Oryza sativa	Ory s
		Ory s_GLUB1
Millet	Panicum miliaceum	Pan m *
Rye, cultivated	Secale cereale	Sec c_flour *
Wheat	Triticum aestivum	Tri a *
		rTri a 14
		rTri a 19
		nTri a aA_TI
Corn, cereal	Zea mays	Zea m *
		rZea m 14
		Zea m_GBSSI
Apple	Malus domestica	rMal d 1
		nMal d 2
		rMal d 3
Peanut	Arachis hypogaea	nAra h 1
		rAra h 2
		nAra h 3
		rAra h 5
		rAra h 6
		rAra h 8
		rAra h 9
		rAra h 15

* Extract

Foods

Common name	Scientific name	Extracts & Components
Soy	Glycine max	Gly m *
		rGly m 4
		rGly m 5
		nGly m 6
		nGly m 8
Lentil	Lens culinaris	Len c *
		Len c 1
		Len c 2
		Len c 3
Pea	Pisum sativum	Pis s *
		Pis s 1
		Pis s 2
		Pis s 3
Cow's milk	Bos domesticus	Bos d_milk *
		nBos d 4
		nBos d 5
		nBos d 8
Egg white	Gallus domesticus	Gal d_white *
		nGal d 1
		nGal d 2
		nGal d 3
		nGal d 4
Egg yolk	Gallus domesticus	Gal d_yolk *
		nGal d 5

Foods

Common name	Scientific name	Extracts & Components
Beef	Bos domesticus	Bos d_meat *
		nBos d 6
		Bos d 7
		Bos d_ACTA1
		Bos d_LDHA
Horse	Equus caballus	Equ c_meat *
Rabbit	Oryctolagus spp.	Ory_meat *
		Ory c_CKM
		Ory c_GAPDH
		Ory c_PGM1
		Ory c_PKM
		Ory c_TPI1
Lamb	Ovis aries	Ovi a_meat *
		Ovi a_IgG
Pig	Sus domesticus	Sus d_meat *
		rSus d 1
Chicken	Gallus domesticus	Gal d_meat *
		Gal d 7
		Gal d 9
		Gal d_PKM
Turkey	Meleagris gallopavo	Mel g *
Mealworm	Tenebrio molitor	Ten m *
Herring, Atlantic	Clupea harengus	Clu h *
		rClu h 1

Foods

Common name	Scientific name	Extracts & Components
Cod, Atlantic	Gadus morhua	Gad m *
		nGad m 1
		Gad m 2+3
		Gad m 4
Salmon, Atlantic	Salmo salar	Sal s *
		Sal s 1
		Sal s 2
		Sal s 3
		Sal s 4
		Sal s 6
		Sal s 7
		Sal s 8
Mackerel, Atlantic	Scomber scombrus	Sco s *
		rSco s 1
Tuna	Thunnus albacares	Thu a *
		Thu a 1
Carrot	Daucus carota	Dau c *
		rDau c 1
Tomato	Solanum lycopersicum	Sola l *
		rSola l 6
Potato	Solanum tuberosum	Sol t *
		Sol t 2
		Sol t_GBSSI

* Extract

nextview

NextView is a newly developed portal where you can manage all your allergy samples, PAX results, immunotherapy orders and reorders, and much more.

- With Nextview you can:
- Follow the status of your samples
- Access all your samples information, if they are in transit, being tested, and when results are expected.
- Easily find all results in one location
- Easily expand your screening results to complete panels
- Forward results directly to your customers for convenience
- Select and order a recommended treatment option with only one click
- Easily access your order history and re-order treatments with only one click
- Request a samples pick up (coming soon)
- Access your treatment reminder system (coming soon)
- Easily access your invoices (coming soon)

Register at www.nextmunelaboratories.co.uk

The PAX results are clearly set out, easy to interpret and include the following information:

O Summary of detectable sensitizations

O Interpretation summary and treatment recommendation

O Detailed results per extract and components

O Detailed interpretation with Information about allergenicity and relevance, time of the year, possible cross-reactivities and treatment indication for each allergen

In addition to all of this, we guarantee a 100% reliable screening test, fast results and continuous support and advice with our vet allergy experts.

PAX Complete result

PAX Screening result

PAX - Pet Allergy Xplorer: The first molecular serum IgE specific test for pets

Dr. Thierry Olivry says:

Molecular allergology is a state-of-the-art approach to the detection of sensitisations, whereby defined single allergen components are used for the determination of specific IgE in place of traditionally-used allergen extracts. The molecular components are purified or recombinant proteins that provide a higher level of standardisation than allergen extracts and enable a more precise identification of IgE sensitisations. Pet Allergy Xplorer (PAX) is the first commercial serological IgE-specific test that uses allergen extracts and molecular components to identify which allergens are affecting pets.

THE PROBLEM
Traditionally, allergy testing in veterinary medicine involves placing an allergen extract on an enzyme linked immunoassay (ELISA) plate to incubate the serum and then administering a reagent that recognizes immunoglobin E (IgE). The resultant color reaction indicates how much IgE is present. This technique, which is used by veterinary laboratories world-wide, has not changed for decades. However, results can vary considerably, depending on the extract used, and false negatives can occur if clinically relevant protein allergen concentrations are not sufficient. For example, the extract for the house dust mite, a common pet allergen, is made by grinding the mite, adding solvents to release the allergenic proteins, and purifying the proteins.
The house dust mite contains more than 10,000 proteins, but only about 40 that cause an allergic reaction are recognized. This means a low percentage of the allergy-causing proteins are seen when an extract is evaluated, especially if a pet has a low IgE level against a particular allergen. This can easily result in a false negative. In addition, extracts can vary not just between laboratories but also allergenic extract, making results hard to reproduce.

THE SOLUTION
To gain more accurate and sensitive information, tests are needed to identify each individual allergenic protein. Instead of testing for the house dust mite (or any particular allergen) as a whole, techniques are needed to test for the specific proteins that cause an allergic reaction. Human practitioners use molecular allergology to determine the allergens causing problems to provide their patients with a better level of care.
Macro Array Diagnostics launched the Allergy Explorer (ALEX), which provides a sensitization profile for human patients based on a test panel composed of allergen extracts and molecular allergens. Since their founding in 2016, the company has launched two generations of ALEX, offering a panel that covers nearly 100% of the world's relevant allergens. It also developed the Food Xplorer (FOX), to detect IgG-mediated food intolerances.

THE INNOVATION
After experiencing allergies myself, and being tested using molecular allergology, I thought the technology could be extremely beneficial to veterinary medicine.
This led to Nextmune partnering with Macro Array Diagnostics to develop the Pet Allergy Xplorer (PAX), the first commercial serological IgE-specific test that uses allergen extracts and molecular components to identify which allergens are affecting pets.

Advantages include:

- Improved reproducibility — A state-of-the-art robot builds each ELISA testing array, providing a the ability to produce an effective hyposensitization therapy that will provide more relief for the pet.
- Improved cross-reactivity identification — Using allergen extracts and molecular components in one test will help identify allergenic cross-reactivity.
- Elucidated poly sensitization — When multiple allergens cause a reaction, PAX will help identify the primary offenders.
- Individualized results — The results provided to the veterinarian will be specific to the region where they live, as well as the pet's species.
- Improved accuracy — PAX uses uniform production method that exceeds current ELISA plate building reproducibility. In addition, a standardization process is used to make the allergenic extracts, improving reproducibility.
- Increased data — Typical allergy testing via serum provides about 90 results, and intradermal testing provides around 60 to 80 results. The PAX cartridge holds 300 positions—100 of which will be extracts and 200 will be molecular components.
- Automated technology — Robots are used throughout the process, decreasing human error. The microarray dots during the plate manufacturing process are dispensed by a robot. In addition, a robot pipettes the serum during the testing phase. Controls are built into the PAX cartridge to ensure the sample has sufficient IgE for testing, and these controls also indicate if the cartridge is used properly.
- Improved treatment — The more accurate and sensitive results that PAX provides will improve pertinent allergens are identified to prevent confusion.
- Ongoing development — The cartridges currently contain the allergenic components and extracts that prevailing research indicates are clinically relevant. As data is gathered through testing, other allergenic components may be discovered. For example, if an extract continues to indicate positive while the individual molecular components indicate negative, we need to determine if another unidentified component is present or a cross reactivity is occurring. This data will help us characterize molecules to add in a single well-characterized anti-IgE monoclonal antibody to detect pet IgE, ensuring a detection level. PAX also uses technology to block cross-reactive carbohydrate determinants (CCD). In some cases, CCDs bind to IgE receptors, creating false positives. The PAX technology uses a blocking agent to prevent this binding. Allergy tests that do not use CCD blockers identify numerous allergens, many of which are irrelevant. This technology ensures only the future versions, revolutionizing the research in pet allergies.

Nextmune is the only veterinary diagnostic laboratory currently using molecular allergology. This next generation test will allow veterinarians to more accurately and sensitively diagnose allergic pets to facilitate treatment strategies. The initial launch for dogs is scheduled for January 2023, followed by tests for cats and horses.

Thierry Olivry, DrVet, PhD, DipECVD, DipACVD, Scientific Advisor and Project Leader
Dr. Olivry is a graduate of the University of Toulouse, France. He completed a dermatology residency and PhD in comparative pathology at UC Davis and is a Diplomate of both ACVD and ECVD. Dr. Olivry spent most of his career as a clinician-scientist at NC State University researching allergic and autoimmune skin diseases and now lives in Riga, Latvia.