ArminLabs testing with AONM

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Agenda

- **The different types of test for pathogens**
  - **B cells: Antibody testing**
  - **T cells: EliSpot testing**
- Deciding what to test for
- Immunological testing
- Mycotoxin testing
- Parasite testing
- Navigating through the webpages

In recent infection, antibody testing is generally reliable if the antigens are specific: you can hope to see an IgM

"Detection of IgM antibodies tends to indicate a recent initial exposure to an antigen, whereas detection of total or IgG antibodies indicates exposure some time ago."[2]

IgM Antibody Functions and its Role in Disease

During infection, innate or "natural immunity" is provided by poly-reactive IgM antibody made by (B1a) B cells. IgM antibody acts to quickly recognize and initiate an immune response by directly neutralizing pathogens or clearing novel antigens. The three components of the IgM antibody-mediated immune response are activation of complement (C1qR and Fcα/μR), recruitment of phagocytic cells, and opsonization. Current research suggests that B1b B cells which make IgM antibodies may provide memory to certain pathogens and support T-cell independent immune responses. IgM antibody also acts as an educator of the immune system by transporting antigens to lymph tissues where memory is induced. Read more »

"The time required for the development of IgG antibodies following HSV infection varies from 21 to over 42 days with most individuals having detectable IgG 21–28 days after exposure to the infection and probably lasting for life.[7–,9] **IgM antibodies are usually detectable 9–10 days after exposure and last 7–14 days**, although they may remain detectable for up to 6 weeks in a minority of individuals.[9–,11] IgM antibodies may be detectable during recurrences of the infection, particularly with some of the commercial ELISAs."[2]

Source: 1. https://www.labtestsonline.org.au/learning/test-index/antibody-tests; 2. https://www.genscript.com/IgM-antibody.html

However, in chronic (continuing) disease, using conventional IgG/IgM antibodies means patients fall between the cracks

In chronic disease, IgG may be there, but will be discounted as "past"; IgM probably will not be present

ENDOCRINOLOGY

Cytomegalovirus Ab(IgG)	183.0	AU/ml
	< 6.0 AU/mL is considered non-reactive	
	>=6.0 AU/mL is considered reactive	
Cytomegalovirus Ab(IgM)	Negative	
Comment	Result suggestive of previous CMV infection.	

IMMUNOLOGY

Epstein-Barr virus screen			
EBNA IgG antibody	* 36	U/ml	(< 5 U/ml Negative)
EBV Early Ag ab.(IgG)	<5	U/ml	(<10 U/ml Negative)
EBV VCA ab.(IgM)	<10	U/ml	(<20 U/ml Negative)
Comment	Results suggestive of past (latent) EBV infection.		

"IgG is produced in a delayed response to an infection and can be retained in the body for a long time …. Detection of IgG usually indicates a prior infection or vaccination."

Source: http://www.microbiologybook.org/mayer/Ab%20formation2000.htm

The most useful antibody in a chronic infection is Immunoglobulin A

IgA is an excellent immunoglobulin as it indicates current, ongoing or very recent infection, as well as chronic persistent infection, reactivation or reinfection

"IgA antibody is the most abundant antibody class in human serum and has a unique role in mediating immunity. IgA is a polyvalent antibody that is translocated to mucosal surfaces as the first line of defense against infections. Most of the secreted IgA lines the mucosal surfaces including respiratory, digestive and genitorurinary tracts to protect against pathogens while maintaining gut homeostasis."

The persistence of IgA antibodies in Yersinia, as an example ➡

JOURNAL ARTICLE

Persistence of IgM, IgG, and IgA Antibodies to *Yersinia* in Yersinia Arthritis

Get access

Kaisa Granfors ✉, Matti Viljanen, Anja Tiilikainen, Auli Toivanen

The Journal of Infectious Diseases, Volume 141, Issue 4, April 1980, Pages 424–429,
https://doi.org/10.1093/infdis/141.4.424
Published: 01 April 1980 **Article history** ▾

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Abstract

IgA antibodies to *Yersinia enterocolitica* were demonstrated in the sera of 13 patients with severe yersinia arthritis who were studied six to eight months after an acute infection with *Yersinia*. Four of the patients were monitored for two to three years, and they continued to demonstrate these antibodies. Only one of 12 control patients (individuals with yersinia infection without arthritis) had IgA antibodies specific to *Yersinia* six to eight months after the acute infection. The persistence of IgO antibodies was also in direct correlation to the occurrence of arthritis, but not as clearly as was the persistence of IgA antibodies. Antibodies of the IgM class persisted in most cases for only one to three months and always disappeared during the first six months after the onset of the infection. Thus, the demonstration of IgA antibodies to *Yersinia* is important in the diagnosis of yersinia arthritis, and the occurrence of IgM

Source: https://www.genscript.com/IgA-antibody.html; Granfors K, Viljanen M, Tiilikainen A, Toivanen A. Persistence of IgM, IgG, and IgA antibodies to Yersinia in yersinia arthritis. J Infect Dis. 1980 Apr;141(4):424-9.

IgA is available for CPn, Mycoplasma, HSV1/2, VZV, Coxsackie, Echovirus, Campylobacter and others

Chlamydia pneum. IgG-/IgA-AB

4	**Chlam.pneum. IgG-AB (ELISA)**	**positive**		**negative**
		! 1,525 Ratio		
	Ratio < 0,8	= negative		
	Ratio 0,8 - 1,1	= weak		
	Ratio >= 1,1	= positive		

4	**Chlam.pneum. IgA-AB (ELISA)**	**positive**		**negative**
		! 1,628 Ratio		
	Ratio < 0,8	= negative		
	Ratio 0,8 - 1,1	= weak		
	Ratio >= 1,1	= positive		

Coxsackie IgG-/IgA-antibodies

3	**Coxsackie-Virus IgG A7 (IFT)**	**+**	**1:100**	**< 1:100**	**[..... *>**
3	**Coxsackie-Virus IgG B1 (IFT)**	**+**	**1:1000**	**< 1:100**	**[..... *>**
3	Coxsackie-Virus IgA A7 (IFT)		<1:10	< 1:10	[....*...]
3	**Coxsackie-Virus IgA B1 (IFT)**	**+**	**1:100**	**< 1:10**	**[..... *>**

The specific Coxsackie-Virus Type B1-IgG-/IgA-antibodies indicate current humoral immune response against Coxsackie-Virus Type B1.
The specific Coxsackie-Virus Type A7-IgG-antibodies indicate humoral immune-response against Coxsackie-Virus Type A7.
The test system is highly specific for Coxsackie Virus antibodies. Other Enterovirus antibodies (f.e. Echovirus antibodies) are not detectable.

Immunoarrays for EBV very useful if they have the full array of markers

9 markers including viral capsid antigen (VCA), early antigen (EA), & Epstein-Barr Nuclear Antigen (EBNA)

Epstein-Barr-Virus Immuno-Array			
EBV VCA p18 IgG	+	positive	negative
EBV VCA p23 IgG	+	positive	negative
EBV EA p54 IgG		negative	negative
EBV EA p138	+	positive	negative
EBV EBNA-1 IgG	+	positive	negative
EBV VCA p18 IgM		negative	negative
EBV VCA p23 IgM		negative	negative
EBV EA p54 IgM	+	positive	negative
EBV EA p138 IgM		negative	negative

The specific EBV-IgG/IgM-, EBV-Early Antigen-antibodies and EBV-EBNA-antibodies indicate humoral immune response against Epstein Barr Virus (former or reactivated or EBV-infection in convalescence?).

ArminLabs is a specialist in precision testing: we also use the other arm of the immune system – T cells

Immunoglobulin A is not available when the infection does not live in the mucosal membranes: EBV (Epstein Barr Virus, glandular fever), CMV (Cytomegalovirus), Parvo Virus B19, etc.

So how to test chronic infection in infections where there is no IgA available?

There is another arm to the immune system that can be tested, too: not just B cells, but T cells. Tests of cellular T-cell immunity are called EliSpots (enzyme-linked immunosorbent spot). This is a lymphocyte transformation test using an Interferon Gamma Release Assay.

"Accuracy, sensitivity, reproducibility, and robustness – a gold standard"

"Enzyme-linked immune absorbent spot (Elispot) is a quantitative method for measuring relevant parameters of T cell activation. The sensitivity of Elispot allows the detection of low-frequency antigen-specific T cells that secrete cytokines and effector molecules, such as granzyme B and perforin. Cytotoxic T cell (CTL) studies have taken advantage with this high-throughput technology by providing insights into quantity and immune kinetics. Accuracy, sensitivity, reproducibility, and robustness of Elispot resulted in a wide range of applications in research as well as in the diagnostic field. Actually, CTL monitoring by Elispot is a gold standard for the evaluation of antigen-specific T cell immunity in clinical trials and vaccine candidates where the ability to detect rare antigen-specific T cells is of relevance for immune diagnostic."

Source: Ranieri E, Popescu I, Gigante M. CTL ELISPOT assay. *Methods Mol Biol.* 2014;1186:75-86.

New "Springer Protocols" book (2024) with a chapter on EliSpots

Book | © 2024

Chapter 6

Adaptive Immune Response Investigation in Lyme Borreliosis

Mihail Pruteanu, Armin Schwarzbach, and Markus Berger

Abstract

To diagnose Lyme Borreliosis, it is advised to use an enzyme-linked immunosorbent test to check for serum antibodies specific for Lyme and all tests with positive or ambiguous enzyme-linked immunosorbent assay (ELISA) results being confirmed by immunoblot. This method of measuring the humoral immunity in human fluids (e.g., by ELISA) has provided robust and reproducible results for decades and similar assays have been validated for monitoring of B cell immunity. These immunological tests that detect antibodies to *Borrelia burgdorferi* are useful in the diagnosis of Borreliosis on a routine basis. The variety of different *Borrelia* species and their different geographic distributions are the main reasons why standards and recommendations are not identical across all geographic regions of the world. In contrast to humoral immunity, the T cell reaction or cellular immunity to the *Borrelia* infection has not been well elucidated, but over time with more studies a novel T cell-based assay (EliSpot) has been developed and validated for the sensitive detection of antigen-specific T cell responses to *B. burgdorferi*. The EliSpot Lyme assay can be used to study the T cell response elicited by *Borrelia* infections, which bridges the gap between the ability to detect humoral immunity and cellular immunity in Lyme disease. In addition, detecting cellular immunity may be a helpful laboratory diagnostic test for Lyme disease, especially for seronegative Lyme patients. Since serodiagnostic methods of the *Borrelia* infection frequently provide false positive and negative results, this T cell-based diagnostic test (cellular assay) may help in confirming a Lyme diagnosis. Many clinical laboratories are convinced that the cellular assay is superior to the Western Blot assay in terms of sensitivity for detecting the underlying *Borrelia* infection. Research also suggests that there is a dissociation between the magnitude of the humoral and the T cell-mediated cellular immune responses in the *Borrelia* infection. Lastly, the data implies that the EliSpot Lyme assay may be helpful to identify *Borrelia* infected individuals when the serology-based diagnostic fails to do so. Here in this chapter the pairing of humoral and cellular immunity is employed to evaluate the adaptive response in patients.

The Elispot technique reflects the current T-cellular activity of bacteria and viruses

"The EliSpot Lyme assay can be used to study the T cell response elicited by Borrelia infections, which bridges the gap between the ability to detect humoral immunity and cellular immunity in Lyme disease. **Many clinical laboratories are convinced that the cellular assay is superior to the Western Blot assay in terms of sensitivity for detecting the underlying Borrelia infection..** Research also suggests that there is a dissociation between the magnitude of the humoral and the T cell-mediated cellular immune responses in the Borrelia infection."

Examples: Borrelia burgdorferi/Mycoplasma

Borrelia burgdorferi Elispot

Borrelia burgdorferi Full Antigen	+	32	SI
Borrelia b. OSP-Mix (OSPA/OSPC/DbpA)	+	29	SI
Borrelia burgdorferi LFA-1	(+)	2	SI

>3 = positive

2-3 = weak positive

<2 = negative

The results of the EliSpot-Tests indicate current cellular activity against Borrelia burgdorferi.

Mycoplasma pneum.EliSpot

1 Mycoplasma pneum. EliSpot ! 7 SI

SI = Stimulation Index
0-1 = negative
2-3 = weak positive
> 3 = positive

The result of the EliSpot test indicates current cellular activity against Mycoplasma pneumoniae.

EliSpots for Epstein Barr Virus and Cytomegalovirus show both lytic and latent values

CMV EliSpot

1 CMV lytic	**!**	**355 SI**

0-1 = negative
2-3 = weak positive
> 3 = positive

1 CMV Latent	**!**	**106 SI**

0-1 = negative
2-3 = weak positive
> 3 = positive

The result of the EliSpot test indicates current celluar activity against Cytomegalo Virus (CMV).

Explanation of CMV antigens:
CMV-lytic antigen: sign for replication of infectious CMV virions
CMV-latent antigen: sign for CMV latency with no production of infectious CMV virions

Lytic = currently replicating

Latent = dormant, but suppressing immunity, and can unfold again with any new assault to the immune system

Particularly high EBV results post COVID, backed up by thousands of lab tests and scientific studies

EBV EliSpot (lytic+latent)

1 EBV EliSpot (lytic) ! 657 SI

0-1 = negative
2-3 = weak positive
> 3 = positive

1 EBV EliSpot (latent) ! 65 SI

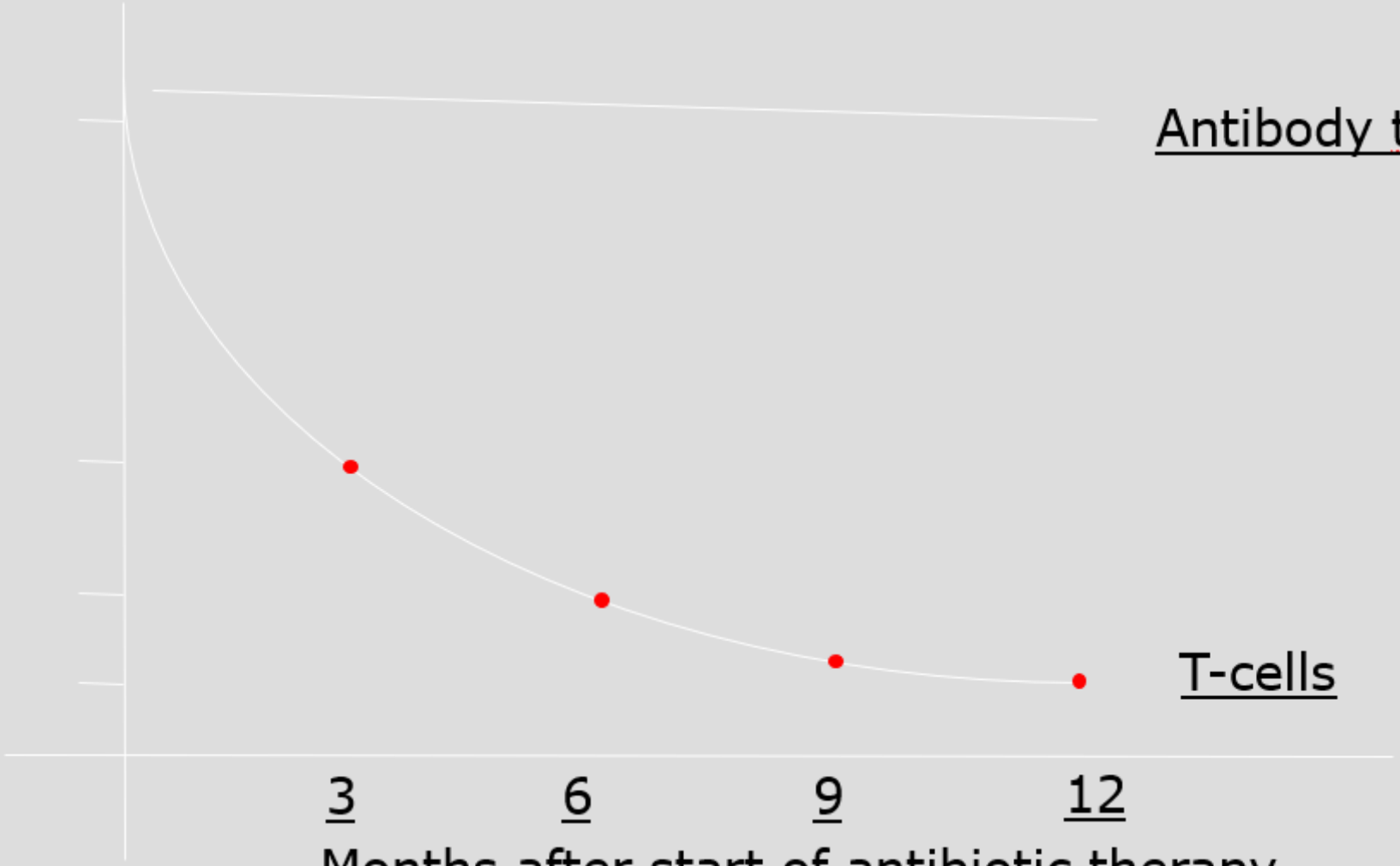
0-1 = negative
2-3 = weak positive
> 3 = positive

The result of the EliSpot test indicates current celluar activity against Epstein-Barr-Virus (EBV).

Explanation of EBV antigens:
EBV-lytic antigen: sign for replication of infectious EBV virions
EBV-latent antigen: sign for EBV latency with no production of infectious EBV virions

Source: Arminlabs laboratory results

EliSpot during antibiotics: "Staging" process



Next generation EliSpot = Lyme iSpot

AUTOIMMUN DIAGNOSTIKA GMBH

Next generation antigens for cellular immune response against Lyme coinfections in routine diagnostics

Next generation EliSpot = Lyme iSpot

AUTOIMMUN DIAGNOSTIKA GMBH

Interpretation

Borrelia iSpot – INF gamma and IL2/ also for SAR-CoV-2

Borrelia iSpot

1	Borr.iSpot INF gamma Full Ag.*	4 SI
1	Borr.iSpot INF gamma OSP-Mix	0 SI
1	Borr.iSpot INF gamma LFA-1	0 SI
1	Borr.iSpot IL2 Full antigen *	2 SI
1	Borr.iSpot IL2 OSP-Mix	0 SI
1	Borr.iSpot IL2 LFA-1	0 SI

SI = Stimulation Index

0-1 = negative
2-3 = weak positive
> 3 = positive

The result of the Borrelia iSpot test indicates positive cellular activity against Borrelia burgdorferi.

Explanation of antigens:
Borrelia-burgdorferi Full Antigen: Borrelia burgdorferi B

**SARS-CoV-2 iSpot *

1	SARS-CoV-2 iSpot light *	
1	Sars-CoV-2 iSpot INF gamma	15 SI
1	Sars-CoV-2 iSpot IL2	18 SI

SI = Stimulation Index

< 5 = negative
5-6 = weak positive
>= 7 = positive

The SARS-CoV-2 iSpots reflect cellular immune responses against SARS-CoV-2.

Explanation of the CoV-iSpot:
Isolated positive reactions of Interferon-Gamma-(IFN-G) activated T-cells reflect current cellular immune reactions in the case of SARS-CoV-2 infection or vaccination.
Similar numbers of IFN-G and IL-2 (Interleukin-2) producing T-cells reflect persistent infections with SARS-CoV-2.
No positive cellular immune reactions of IFN-G-producing effector cells, but positive cellular immune reactions of IL-2-producing memory cells reflect past SARS-CoV-2 infections or vaccinations.
Isolated positive reactions of IL-2-activated T-cells reflect presence of memory cells as a sign of past infection with SARS-CoV-2/Coronaviridae or vaccination with potential cellular immunity.

Covid testing: Evidence of SARS-CoV-2 circulating

Analysis	Result	Units	Reference Range
SARS-CoV2 virus IgG/IgA Ab			
3 SARS CoV2 IgG-Ab	**positive**		**negative**
	! 5,021	**Ratio**	
Ratio < 0,8	= negative		
Ratio 0,8 - 1,1	= weak		
Ratio >= 1,1	= positive		
3 SARS CoV2 IgA-Ab	**positive**		**negative**
	! 1,140	**Ratio**	
Ratio < 0,8	= negative		
Ratio 0,8 - 1,1	= weak		
Ratio >= 1,1	= positive		

Analysis	Result	Units	Reference Range
SARS-CoV2 virus IgG/IgA Ab			
3 SARS CoV2 IgG-Ab	**positiv**		**negativ**
	! 51,650	**BAU/ml**	
<25,6 BAU/ml:	negative		
25,6 bis 35,2 BAU/ml:	weak		
>35,2 BAU/ml:	: positive		
Attention! changed reference range!			
please note!			
3 SARS CoV2 IgA-Ab	negative		negative
	0,647	Ratio	
Ratio < 0,8	= negative		
Ratio 0,8 - 1,1	= weak		
Ratio >= 1,1	= positive		

Sign of good immunity to the virus (IgG), but no current infection (IgA)

PhD.

Agenda

- The different types of test for pathogens
  - B cells: Antibody testing
  - T cells: EliSpot testing
- **Deciding what to test for**
- Immunological testing
- Mycotoxin testing
- Parasite testing
- Navigating through the webpages

Electronic checklist helps decide which coinfections to test for in Post-COVID; fills automatically

Post-Covid Checklist

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Name, first name ..... Date (DD/MM/YYYY) .....

	Your current and former symptoms Please click on the boxes next to the symptoms that you suffer from	X
1	Stomach ache, gut problems	☐
2	Anaemia	☐
3	Diarhoea intermittent, intestinal crampings/pain	☐
4	Fever or feverish feeling	☐
5	Lack of concentration, memory loss, forgetfulness	☒
6	Encephalitis/Inflammation of the brain	☐
7	Yellowish colour of the skin/eyes	☐
8	Painful joints or swollen joints	☒
9	General aches and pains, tendon problems	☐
10	Flu-like symptoms	☒
11	Rash(es), striae, exanthema	☐
12	Small red/purple spots of the skin	☐
13	Heart problems, disturbed cardiac rhythm	☐
14	Cough, expectoration, "air-hunger"	☐
15	Headache, dizziness	☐
16	Impaired liver function/ liver laboratory values	☐
17	Pneumonia, bronchitis	☐
18	Swollen lymph nodes	☒
19	Enlargement of the spleen	☐
20	Fatigue / exhaustion, intermittent or chronic CFS	☒
21	Muscle pain, muscle weakness	☐
22	Shivering, chill	☐
23	Blurred, foggy, cloudy, flickering, double vision	☐
24	Nausea, vomiting	☐
25	Dark urine	☐
26	Itching or pain when urinating	☐
27	Tingling, numbness, "burning" sensations	☐
28	Neck pain, neck stiffness	☐
29	Shoulder pain	☐

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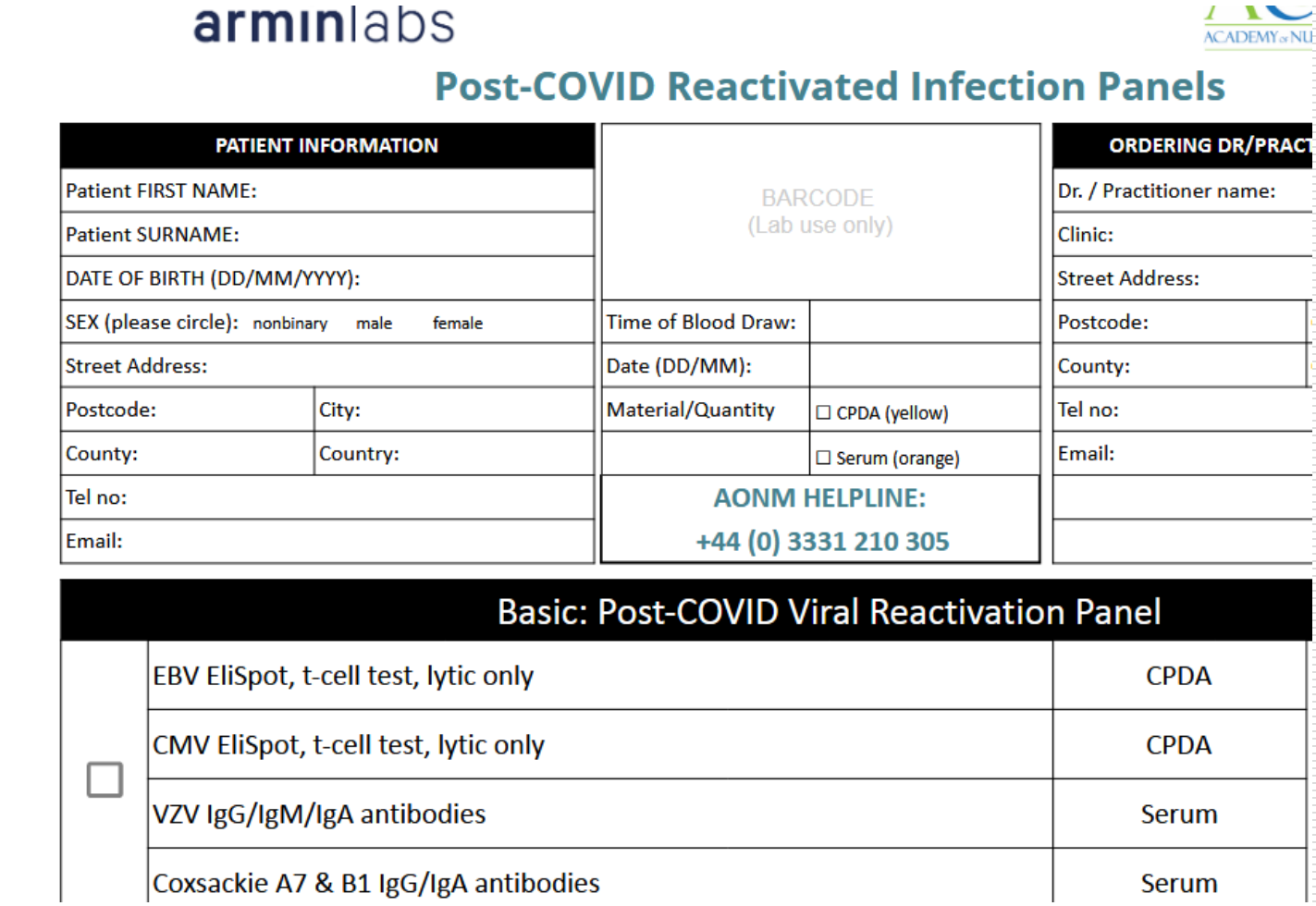
AONM ACADEMY OF NUTRITIONAL MEDICINE

Ranked in order of priority:
CPn, Mycoplasma and the Herpesviruses draw for first place here ↓

Below you'll find the number of the symptoms for each of the infections that we test for and the ranking, in which order you should test for them

Ranking of the infections	No. of symptoms	Rank
Chlamydia pneumoniae	4	1
Mycoplasma pneumoniae	4	1
Yersinia	2	3
Campylobacter	2	3
HSV 1/2	4	1
EBV	4	1
CMV	4	1
VZV	3	2
HHV 6	4	1
Parvovirus	3	2
Coxsackie-Virus	3	2
Echovirus	2	3

NEW: ArminLabs Post-COVID Viral Reactivation Panels: Basic and Advanced



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ACADEMY of NU

Post-COVID Reactivated Infection Panels

PATIENT INFORMATION		BARCODE (Lab use only)		ORDERING DR/PRACT
Patient FIRST NAME:				Dr. / Practitioner name:
Patient SURNAME:				Clinic:
DATE OF BIRTH (DD/MM/YYYY):				Street Address:
SEX (please circle): nonbinary male female		Time of Blood Draw:		Postcode:
Street Address:		Date (DD/MM):		County:
Postcode:	City:	Material/Quantity	☐ CPDA (yellow)	Tel no:
County:	Country:		☐ Serum (orange)	Email:
Tel no:		AONM HELPLINE:		
Email:		+44 (0) 3331 210 305		

Basic: Post-COVID Viral Reactivation Panel		
☐	EBV EliSpot, t-cell test, lytic only	CPDA
	CMV EliSpot, t-cell test, lytic only	CPDA
	VZV IgG/IgM/IgA antibodies	Serum
	Coxsackie A7 & B1 IgG/IgA antibodies	Serum

Advanced reactivated infection panel includes further viruses, and bacteria

	Advanced: Post-COVID Reactivated Infection Panel	
☐	EBV EliSpot, t-cell test, lytic only	CPDA
	CMV EliSpot, t-cell test, lytic only	CPDA
	VZV IgG/IgM/IgA antibodies	Serum
	Coxsackie A7 & B1 IgG/IgA antibodies	Serum
	HSV 1 & 2 IgG/IgM/IgA antibodies	Serum
	HHV6 EliSpot, t-cell test	CPDA
	Chlamydia pneumoniae IgG/IgA antibodies	Serum
	Mycoplasma pneumoniae IgG/IgA antibodies	Serum

AONM ArminLabs Test Panel INFORMATION SHEET

NUMBER	NAME	MATERIAL	PRICE
#77 MAIN ORDER FORM	**A2 Standard Virus Panel** EBV Elispot (2 Antigens: Lytic + Latent) HSV 1 + 2 Elispot CMV Elispot (2 Antigens: Lytic + Latent) Coxsackievirus A7 + B1 IgG/IgA antibodies HHV 6 Elispot	1x Serum 3x CPDA	£479 (tests ordered individually £605)
#78 MAIN ORDER FORM	**B2 Extended Virus Panel** EBV Elispot (2 Antigens: Lytic + Latent) EBV IgG/IgM/EBNA Antibodies HSV 1 + 2 Elispot HSV 1 + 2 IgG/IgM/IgA Antibodies CMV Elispot (2 Antigens: Lytic + Latent) Coxsackievirus A7 + B1 IgG/IgA antibodies HHV-6 Elispot VZV IgG/IgM/IgA Antibodies	1x Serum 3x CPDA	£737 (tests ordered individually £907)
#79 MAIN ORDER FORM	**C2 Comprehensive Bacteria Panel** Borrelia ELISpot CD3-/CD57+/CD56+/CD45+ Cells Tickplex Basic (Borrelia IgG/IgM antibodies) Ehrlichia & Anaplasma ELISpot Bartonella henselae Elispot Babesia microti Elispot Chlamydia pneumoniae ELISpot Chlamydia pneumoniae IgG/IgA Antibodies Mycoplasma pneumoniae Elispot Mycoplasma pneumoniae IgG/IgA Antibodies Yersinia enterocolitica ELISpot	1x Serum 3x CPDA 1x EDTA 1x Heparin	£910 (tests ordered individually £1,057)
#80 MAIN ORDER FORM	**D2 Stealth Pathogen Panel** Borrelia ELISpot CD3-/CD57+/CD56+/CD45+ Cells Chlamydia pneumoniae ELISpot Chlamydia pneumoniae IgG/IgA Antibodies Mycoplasma pneumoniae IgG/IgA Antibodies EBV Elispot (2 Antigens: Lytic + Latent) HSV 1 + 2 Elispot CMV Elispot (2 Antigens: Lytic + Latent) Coxsackievirus A7 + B1 IgG/IgA antibodies	1x Serum 3x CPDA 1x EDTA 1x Heparin	£844 (tests ordered individually £1,024)
#207 ADDITIONAL TESTS ORDER FORM	**Electrolyte Panel** Organ Profile: FBC, CK, Sodium, Potassium, Alk Phos., AST, ALT, GGT, LDH, CHE, Amylase, Lipase, Bilirubin, Uric Acid, Creatinine, eGFR, TSH Calcium Chloride Magnesium red cell (intraerythrozytär)	1x Serum 2x EDTA	£123 (tests ordered individually £133)

NUMBER	NAME	MATERIAL	PRICE
#201 MAIN ORDER FORM	**Post-COVID Viral Reactivation Panel: Light** EBV ElISpot (1 Antigen: Lytic only) CMV ElISpot (1 Antigen: Lytic only) VZV IgG/IgM/IgA antibodies Coxsackievirus A7 + B1 IgG/IgA antibodies	1x Serum 3x CPDA	£344
#202 MAIN ORDER FORM	**Post-COVID Viral Reactivation Panel: Advanced** EBV ElISpot (1 Antigen: Lytic only) CMV ElISpot (1 Antigen: Lytic only) VZV IgG/IgM/IgA antibodies Coxsackievirus A7 + B1 IgG/IgA antibodies HSV 1 + 2 IgG/IgM/IgA antibodies Human Herpesvirus 6 (HHV-6) ElISpot Chlamydia pneumoniae IgG/IgA antibodies Mycoplasma pneumoniae IgG/IgA antibodies	1x Serum 3x CPDA	£606
#203 MAIN ORDER FORM	**FTP1 Panel** Borrelia ELISpot Bartonella henselae ELISpot EBV ElISpot (1 Antigen: Lytic only) CMV ElISpot (1 Antigen: Lytic only) VZV IgG/IgM/IgA antibodies Coxsackievirus A7 + B1 IgG/IgA antibodies HSV 1 + 2 IgG/IgM/IgA antibodies Human Herpesvirus-6 (HHV-6) ElISpot Chlamydia pneumoniae IgG/IgA antibodies Mycoplasma pneumoniae IgG/IgA antibodies	1x Serum 3x CPDA	£847 (tests ordered individually £863)
#204 MAIN ORDER FORM	**SJ1 Panel** Borrelia ELISpot CD3-/CD57+/CD56+/CD45+ Cells EBV ELISpot (2 Antigens: Lytic + Latent) Coxsackievirus A7 + B1 IgG/IgA antibodies RANTES Anti-DNase B Anti-Streptolysin O	1x Serum 3x CPDA 1x EDTA 1x Heparin	£599 (tests ordered individually £608)
#205 ADDITIONAL TESTS ORDER FORM	**Iron / Copper Panel** Copper Caeruloplasmin Ferritin Transferrin Saturation (TS), Iron, & Transferrin	1x Serum	£63 (tests ordered individually £75)
#206 ADDITIONAL TESTS ORDER FORM	**Thyroid Panel** Thyroid antibodies (MAK, TAK, TRAK) Thyroid hormones (TSH, fT3, fT4) Iodine Reverse T3	1x Serum	£282 (tests ordered individually £317)

Currently EliSpots and iSpots are available for:

- Borrelia burgdorferi (B.b. sensu stricto + garinii + afzelii)
- Borrelia myamotoi
- Ehrlichia/Anaplasma
- Bartonella henselae EliSpot
- Babesia microti EliSpot
- Rickettsia conorii/rickettsii/helvetica
- Chlamydia pneumoniae
- Chlamydia trachomatis
- Mycoplasma pneumoniae
- Yersinia species
- Epstein Barr Virus (EBV)
- Cytomegalovirus (CMV)
- Herpes Simplex Virus 1 / 2 (HSV 1 / 2)
- Varicella Zoster Virus (VZV)
- Candida
- Aspergillus
- SARS-CoV-2

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CD3+/57+ cells can give indications of viral/bacterial immunity

Haematology *

6 Blood count					
6 Leucocytes		8,41 Tsd./ul	4,00 - 10,40	[.....*..	]
6 Erythrocytes	**-**	**3,65 Mill./ul**	**3,96 - 5,16**	**<* .....]**	
6 Hemoglobin	**-**	**10,7 g/dl**	**11,6 - 15,5**	**<* .....]**	
6 Hematocrit		37,40 %	35,00 - 45,00	[.*.....	]
6 MCV	**+**	**102,50 fl**	**80,00 - 96,00**	**[..... *>**	
6 MCH		29,30 pg	26,00 - 33,00	[...*....	]
6 MCHC	**-**	**28,60 g/dl**	**32,00 - 36,00**	**<* .....]**	
6 Thrombocytes	**+**	**444,00 Tsd./ul**	**176,00 - 391,00**	**[..... *>**	
6 Differential Blood count					
6 Neutroph. Granulocytes	**+**	**79,50 %**	**40,00 - 75,00**	**[..... *>**	
6 Lymphocytes	**-**	**13,30 %**	**17,00 - 47,00**	**<* .....]**	
6 Monocytes		5,10 %	4,00 - 12,00	[.*.....	]
6 Eosin. Granulocytes		0,80 %	< 7,00	[*.....	]
6 Basoph. Granulocytes		1,30 %	< 2,00	[.....*..	]

CD3-/CD57+ Cells

6 CD3-/CD56+ Flow Cytometry					
6 T cells CD3+ (%)	**+**	**80,87 %**	**62,00 - 80,00**	**[..... *>**	
6 T cells CD3+ (absolute)		905 /ul	900 - 1900	[*.....	]
6 NK cells CD56+ CD3- (%)		11,73 %	6,00 - 29,00	[.*.....	]
6 NK cells CD56+ CD3- (absolute)		131 /ul	60 - 700	[*.....	]
6 CD57+ NK-cells (%)		32,16 %	2,00 - 77,00	[...*....	]
6 CD57+ NK-cells (absolute)	**-**	**42 /ul**	**100 - 360**	**<* .....]**	

The result of the CD57-cell count indicates chronic immune-suppression, which can be caused by Borrelia burgdorferi or other bacteria like Chlamydia pneumoniae or Mycoplasma pneumoniae.

Immunosuppression evident from CD3+/57+ cells here – both viral and bacterial

CD3-/CD57+ Cells

2 CD3-/CD56+ Flow Cytometry					
2 T cells CD3+ (%)	**-**	**47,83 %**	**59,70 - 82,00**	**<***	**.....**
2 T cells CD3+ (absolute)	**-**	**398 /ul**	**900 - 2600**	**<***	**.....**
2 NK cells CD56+ CD3- (%)		11,07 %	5,40 - 30,90	[	.*.....]
2 NK cells CD56+ CD3- (absolute)		92 /ul	77 - 427	[	*.....]
2 CD57+ NK-cells (%)		46,25 %	2,00 - 77,00	[	....*...]
2 CD57+ NK-cells (absolute)	**-**	**43 /ul**	**100 - 360**	**<***	**.....**

The result of the CD57-cell count indicates chronic immune-suppression, which can be caused by Borrelia burgdorferi or other bacteria like Chlamydia pneumoniae or Mycoplasma pneumoniae.

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- Parasite testing
- Navigating through the webpages

Direct test of Mycotoxins in serum now available: ToxiPlex

Direct immunochemical detection of multiple mycotoxins

TOXIPLEX BASIC **DIRECTLY** detects Aflatoxin B1 (AFB1), Deoxynivalenol (DON), Fumonisin (FUM), Ochratoxin A (OTA), and Zearalenone (ZEA).

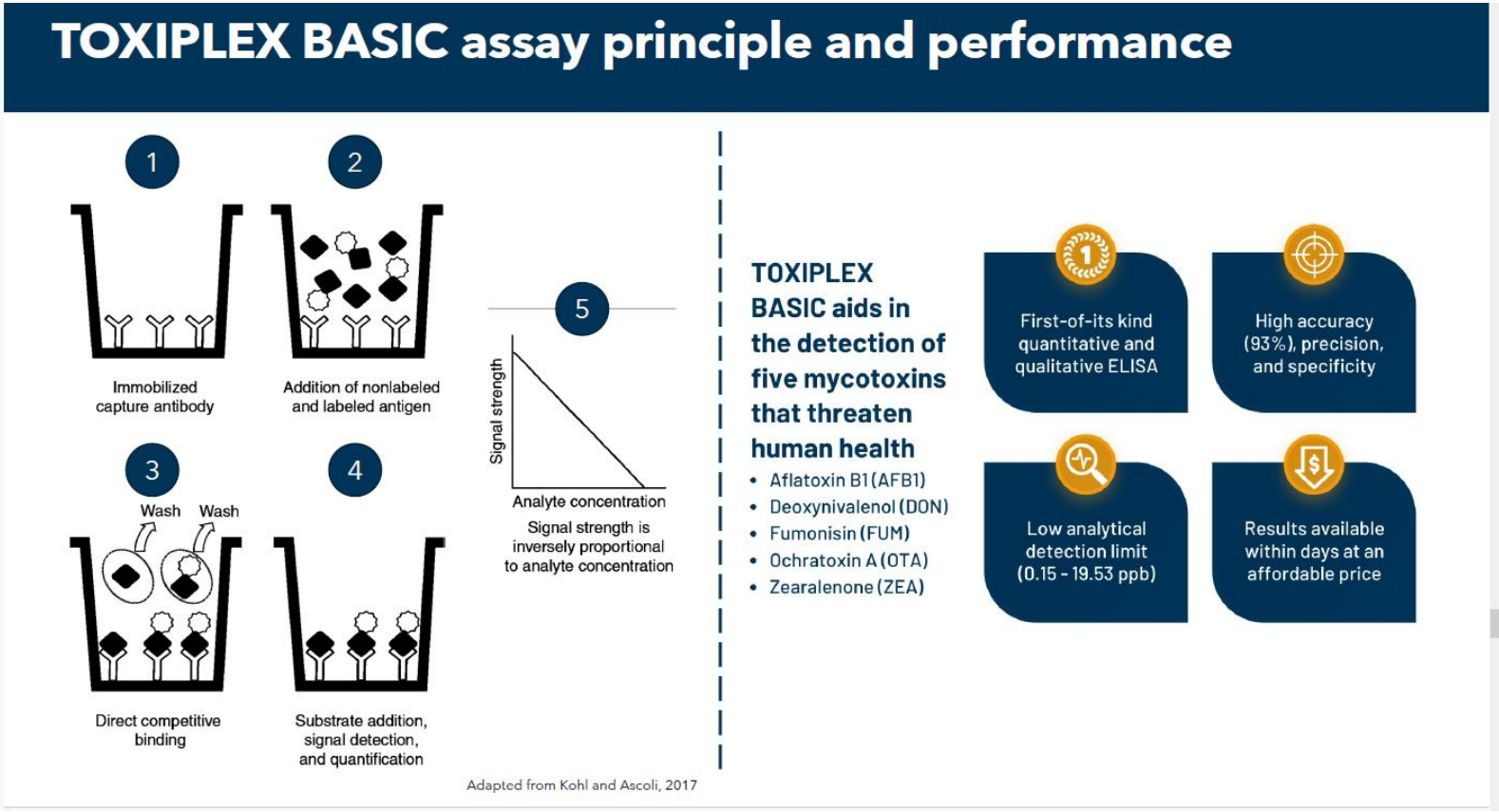
TOXIPLEX BASIC **DOES NOT** detect human antibody responses (IgA, IgG, IgE, etc.) against AFB1, DON, FUM, OTA, and ZEA.

TOXIPLEX BASIC **DOES NOT** measure mycotoxins in human urine because,

1. The use of human plasma or serum is five times more common than urine in literature (PubMed)
2. Variation in urine volume requires creatinine normalization
3. Daily mycotoxin intake variation demands 24hr sampling

Directly detects mycotoxin molecules

Toxiplex directly detects mycotoxin molecules. They coat monoclonal antibodies on the ELISA plates that are highly specific to each particular mycotoxin. If that mycotoxin is present in the patient's sample (extracted from serum), it will be captured by the corresponding monoclonal antibody.



Comparison with other mycotoxin tests

TOXIPLEX BASIC in comparison with other test providers

FEATURES	TOXIPLEX BASIC	MYCOTOX PROFILE	REALTIME PANEL	MY MYCO LAB PANEL
Easy sample collection and handling	YES (serum/plasma)	YES (urine)	YES (urine)	YES (serum/plasma)
Detecting the presence of mycotoxin molecules	YES	YES	YES	NO
Test for all five common mycotoxins*	YES	NO	NO	NO
Robust test performance characteristics**	YES	NA	NA	NA
Time to receive test results	< 1 week	3-4 weeks	1-2 weeks	NA

* Aflatoxin B1, Deoxynivalenol, Fumonisin B1/B2, Ochratoxin A, and Zearalenone are the most commonly occurring mycotoxins in food that affect human health (Source: FDA, EFSA, and Food Standards Agency)

** TOXIPLEX demonstrates high analytical accuracy (93%) and low detection limit (0.15 - 19.53 ppb). To learn more, refer to Garg et al, 2022 at https://doi.org/10.3390/toxins14110727

NA = Data or information not readily available.

Results (example)

ArminLabs | MVZ für Integrative Diagnostik und Medizin GmbH - branch practice · Zirbelstr. 58 2nd floor · 86154 Augsburg · Germany

MVZ für Integrative Diagnostik
und Medizin GmbH
Zirbelstr. 58

D 86154 Augsburg

Patient :

Date of Birth:

Final report Order-ID : **Page 1/ 1**
Date of Reception/Report :

Analysis	Result Units	Reference Range	Chart
ToxiPlex			
6 Aflatoxin B1	negative	negative	
6 Deoxynivalenol	62.4 ppb	negative	
6 Fumonisin (B1+B2)	negative	negative	
6 Ochratoxin A	312.5 ppb	negative	
6 Zearalenone	negative	negative	

Mycotoxin type	Detected (YES / NO)	Calculated concentration (ppb)
Aflatoxin B1 (AFB1)	NO	< 0.61
Deoxynivalenol (DON)	YES	62.4
Fumonisin (FUM)	NO	< 4.88
Ochratoxin A (OTA)	YES	> 312.5
Zearalenone (ZEA)	NO	< 0.15

Plate controls	
Positive	PASS
Negative	PASS

Serologically evidence of an immune reaction against the Deoxynivalenol and Ochratoxin A by TOXIPLEX BASIC test.

»Deoxynivalenol: Belonging to the mycotoxin family of trichothecenes, this is found mainly in cereals,such as wheat and beans, as well as in spices. It can also be found in homes, basements, on the filters of air conditioners in cars or triggered through moisture or water damage.
Because it is metabolised rapidly, short-termsymptoms may include nausea, vomiting, abdominal pain, headache, dizziness, and fever. Effects atthe cellular level are due to binding to ribosomal subunits and inhibition of protein synthesis.Membrane function is

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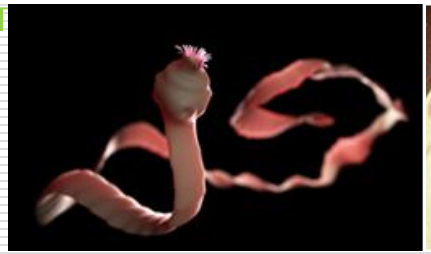
Stool-based Parasite Multiplex PCR test



Two unique panels available:

For Intestinal Protozoa:
Giardia lamblia, Entamoeba histolytica, Crypto-sporidium spp., Blastocytis hominis, Dientamoeba fragilis, Cyclospora cayetanensis

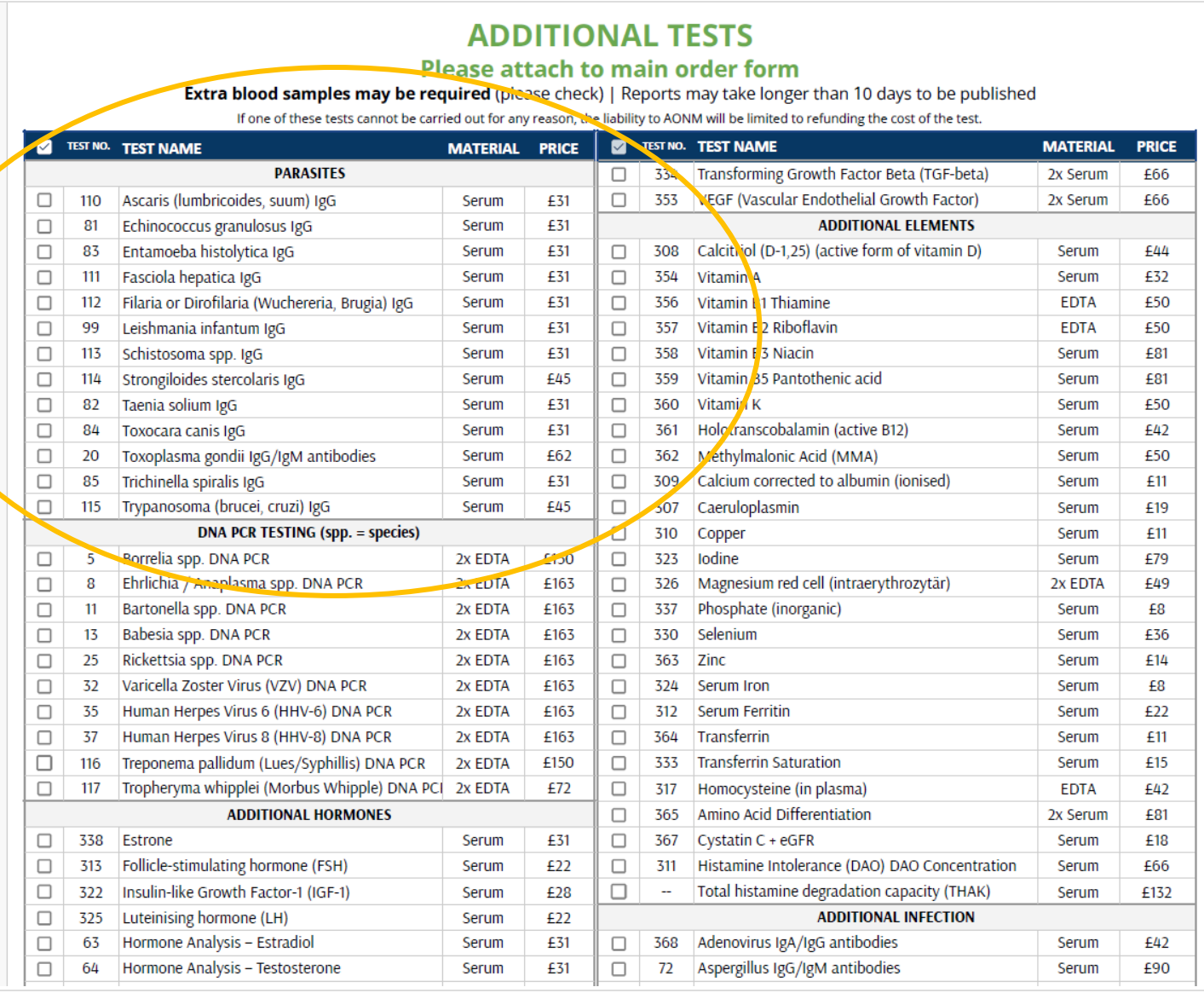
For Intestinal Helminths (worms):

Ancylostoma spp., Ascaris spp., Enterobius vermicularis, Hymenolepis spp., Enterocytozoon spp./Encephalitozoon spp., Necator americanus, Strongyloides spp., Taenia spp., Trichuris trichiura

Accuracy = ≥ 99.9%, detection limit was 100 copies/reaction
Fast processing and easy sample handling – optimized for the detection of parasites in stool, does not need to be frozen and does not require large amounts of material
Swift return of results: 3-7 days after receipt of the sample

Checklist available for easier identification of which to test for:
https://aonm.org/wp-content/uploads/2024/02/english-parasite-coinfection-checklist-arminlabs.pdf

Can also test for parasites in blood



ADDITIONAL TESTS

Please attach to main order form

Extra blood samples may be required (please check) | Reports may take longer than 10 days to be published

If one of these tests cannot be carried out for any reason, the liability to AONM will be limited to refunding the cost of the test.

TEST NO.	TEST NAME	MATERIAL	PRICE
	PARASITES		
110	Ascaris (lumbricoides, suum) IgG	Serum	£31
81	Echinococcus granulosus IgG	Serum	£31
83	Entamoeba histolytica IgG	Serum	£31
111	Fasciola hepatica IgG	Serum	£31
112	Filaria or Dirofilaria (Wuchereria, Brugia) IgG	Serum	£31
99	Leishmania infantum IgG	Serum	£31
113	Schistosoma spp. IgG	Serum	£31
114	Strongiloides stercolaris IgG	Serum	£45
82	Taenia solium IgG	Serum	£31
84	Toxocara canis IgG	Serum	£31
20	Toxoplasma gondii IgG/IgM antibodies	Serum	£62
85	Trichinella spiralis IgG	Serum	£31
115	Trypanosoma (brucei, cruzi) IgG	Serum	£45
	DNA PCR TESTING (spp. = species)		
5	Borrelia spp. DNA PCR	2x EDTA	£150
8	Ehrlichia / Anaplasma spp. DNA PCR	2x EDTA	£163
11	Bartonella spp. DNA PCR	2x EDTA	£163
13	Babesia spp. DNA PCR	2x EDTA	£163
25	Rickettsia spp. DNA PCR	2x EDTA	£163
32	Varicella Zoster Virus (VZV) DNA PCR	2x EDTA	£163
35	Human Herpes Virus 6 (HHV-6) DNA PCR	2x EDTA	£163
37	Human Herpes Virus 8 (HHV-8) DNA PCR	2x EDTA	£163
116	Treponema pallidum (Lues/Syphillis) DNA PCR	2x EDTA	£150
117	Tropheryma whipplei (Morbus Whipple) DNA PCI	2x EDTA	£72
	ADDITIONAL HORMONES		
338	Estrone	Serum	£31
313	Follicle-stimulating hormone (FSH)	Serum	£22
322	Insulin-like Growth Factor-1 (IGF-1)	Serum	£28
325	Luteinising hormone (LH)	Serum	£22
63	Hormone Analysis – Estradiol	Serum	£31
64	Hormone Analysis – Testosterone	Serum	£31

TEST NO.	TEST NAME	MATERIAL	PRICE
334	Transforming Growth Factor Beta (TGF-beta)	2x Serum	£66
353	VEGF (Vascular Endothelial Growth Factor)	2x Serum	£66
	ADDITIONAL ELEMENTS		
308	Calcitriol (D-1,25) (active form of vitamin D)	Serum	£44
354	Vitamin A	Serum	£32
356	Vitamin B1 Thiamine	EDTA	£50
357	Vitamin B2 Riboflavin	EDTA	£50
358	Vitamin B3 Niacin	Serum	£81
359	Vitamin B5 Pantothenic acid	Serum	£81
360	Vitamin K	Serum	£50
361	Holotranscobalamin (active B12)	Serum	£42
362	Methylmalonic Acid (MMA)	Serum	£50
309	Calcium corrected to albumin (ionised)	Serum	£11
307	Caeruloplasmin	Serum	£19
310	Copper	Serum	£11
323	Iodine	Serum	£79
326	Magnesium red cell (intraerythrozytär)	2x EDTA	£49
337	Phosphate (inorganic)	Serum	£8
330	Selenium	Serum	£36
363	Zinc	Serum	£14
324	Serum Iron	Serum	£8
312	Serum Ferritin	Serum	£22
364	Transferrin	Serum	£11
333	Transferrin Saturation	Serum	£15
317	Homocysteine (in plasma)	EDTA	£42
365	Amino Acid Differentiation	2x Serum	£81
367	Cystatin C + eGFR	Serum	£18
311	Histamine Intolerance (DAO) DAO Concentration	Serum	£66
--	Total histamine degradation capacity (THAK)	Serum	£132
	ADDITIONAL INFECTION		
368	Adenovirus IgA/IgG antibodies	Serum	£42
72	Aspergillus IgG/IgM antibodies	Serum	£90

Parasite Checklist

arminlabs

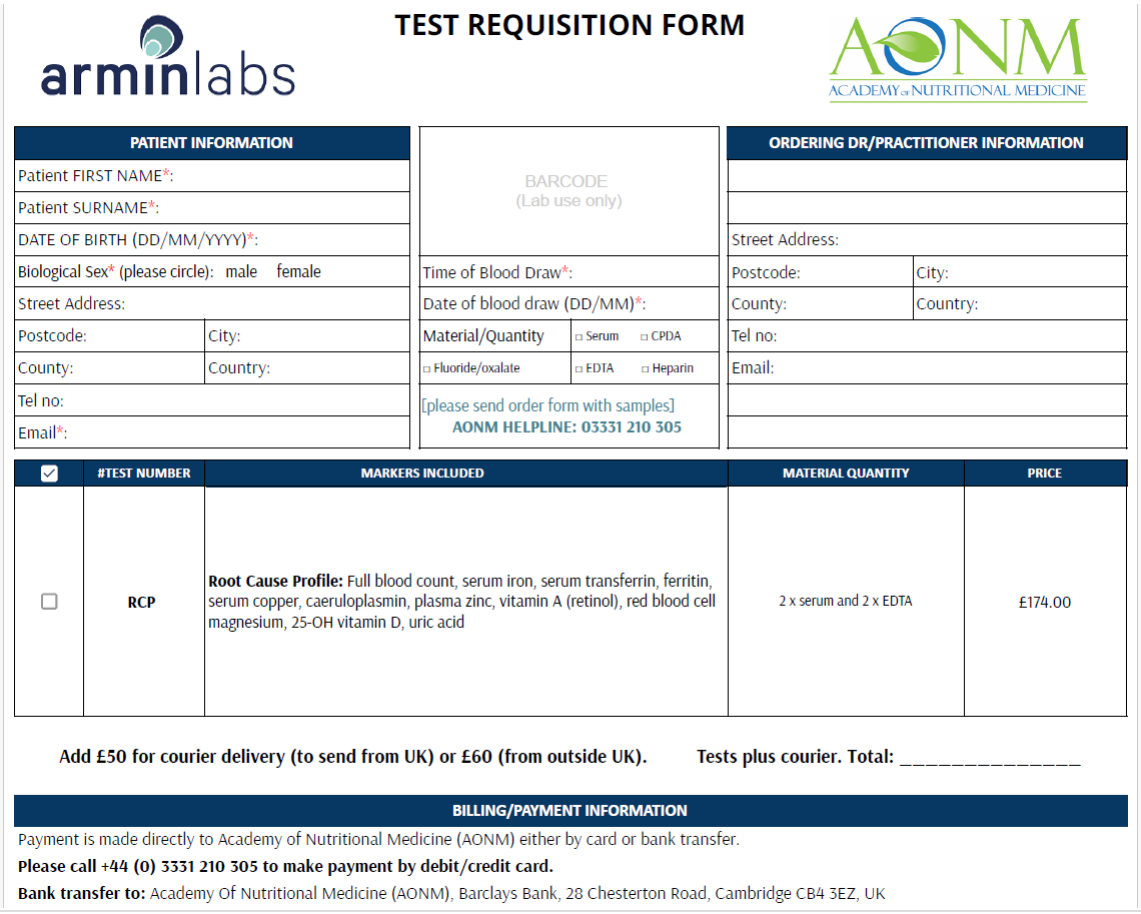
Name, First name ..... Date (DD/MM/YYYY) .....

►	Current and past symptoms (Please mark with a cross)		Score points filled in by the therapist	Ranking
1	Close contact with dogs, cats, or other pets	☐	Ascaris lumbricoides/suum	
2	Trips to Africa, Asia or other tropical countries in the last 6 months.	☐	Echinococcus granulosus	
3	Lover of semi-raw meat (pork, beef, etc)	☐	Entamoeba histolytica	
4	Muscle pain, painful joints or swollen joints	☐	Fasciola hepatica	
5	Skin pallor, asthenia, irritability	☐	Filaria or Dirofilaria (Wuchereria, Brugia)	
6	Sleeplessness	☐	Leishmania spp.	
7	Skin or eyelid oedema, Quincke oedema	☐	Trypanosoma spp.	
8	Anorexia, weight loss and weakness, heavy salivation, nausea, vomiting	☐	Schistosoma spp.	
9	Abdominal discomfort, pain in the right hypochondrium, or epigastric pain	☐	Strongiloides stercolaris	
10	Intestinal cramps/pain, alternating diarrhea and constipation	☐	Taenia solium	
11	Exhaustion/intermittent fatigue, asthenia, diminished work capacity	☐	Toxocara canis	
12	Fever or feverish feeling, with abundant sweating or inability to sweat	☐	Toxoplasma gondii	
13	Episodical or severe fever (over 40°C)	☐	Trichinella spiralis	
14	Headache, dizziness, gnashing of teeth, convulsions	☐		
15	Reduction in physical and mental stamina, vitamin deficiency, malabsorption	☐		
16	Diffuse chest pain, cough, expectorations, difficulty breathing, asthmatic syndrome	☐		
17	Hypereosinophilia or another allergic manifestation	☐		
18	Rash, urticaria, skin itching, erythema, exanthema	☐		
19	Linear dermatitis (creeping eruption)	☐		
20	Swelling of the lymph nodes, lymphatic stasis	☐		
21	Eye/vision disorder, sharp decrease in vision in the last year	☐		
22	Enlargement of the spleen and/or liver	☐		
23	Neurological disorders,neuro-sensitivity disorders, psychosis	☐		

We pinpoint the cause

Parasite checklist with autofill function also available (see second on the Dropdown under the ArminLabs tab)

Root Cause Profile



armin labs

TEST REQUISITION FORM

AONM ACADEMY OF NUTRITIONAL MEDICINE

PATIENT INFORMATION		BARCODE (Lab use only)		ORDERING DR/PRACTITIONER INFORMATION	
Patient FIRST NAME*:					
Patient SURNAME*:					
DATE OF BIRTH (DD/MM/YYYY)*:				Street Address:	
Biological Sex* (please circle): male female		Time of Blood Draw*:		Postcode:	City:
Street Address:		Date of blood draw (DD/MM)*:		County:	Country:
Postcode:	City:	Material/Quantity	□ Serum □ CPDA	Tel no:	
County:	Country:	□ Fluoride/oxalate	□ EDTA □ Heparin	Email:	
Tel no:		[please send order form with samples] AONM HELPLINE: 03331 210 305			
Email*:					

☑	#TEST NUMBER	MARKERS INCLUDED	MATERIAL QUANTITY	PRICE
☐	RCP	**Root Cause Profile:** Full blood count, serum iron, serum transferrin, ferritin, serum copper, caeruloplasmin, plasma zinc, vitamin A (retinol), red blood cell magnesium, 25-OH vitamin D, uric acid	2 x serum and 2 x EDTA	£174.00

Add £50 for courier delivery (to send from UK) or £60 (from outside UK). **Tests plus courier. Total: _____**

BILLING/PAYMENT INFORMATION

Payment is made directly to Academy of Nutritional Medicine (AONM) either by card or bank transfer.

Please call +44 (0) 3331 210 305 to make payment by debit/credit card.

Bank transfer to: Academy Of Nutritional Medicine (AONM), Barclays Bank, 28 Chesterton Road, Cambridge CB4 3EZ, UK

Rationale

The Root Cause Protocol emphasises the disregarded role of bioavailable copper in our physiology. It has multiple roles, particularly in energy production – without it, the mitochondria cannot work. It is also essential for erythropoiesis (the production of new red blood cells), our antioxidant enzymes, thyroid function, neurotransmitter cofactors, and much more. The Root Cause Profile is a specific set of markers that include the copper transport protein, caeruloplasmin (which is so rarely included in blood tests), retinol (the real vitamin A, which is vital for caeruloplasmin synthesis, and others. Ferritin is interestingly not a good marker of iron levels at all, though it is often the only one used. This profile includes a full iron profile, allowing it to be compared to copper, caeruloplasmin and the other markers to derive a pattern that is very useful in determining the underlying causes of what is often erroneously considered to be iron deficiency anaemia, but is actually the inability of the organism to carry bioavailable Cu to its needed targets.

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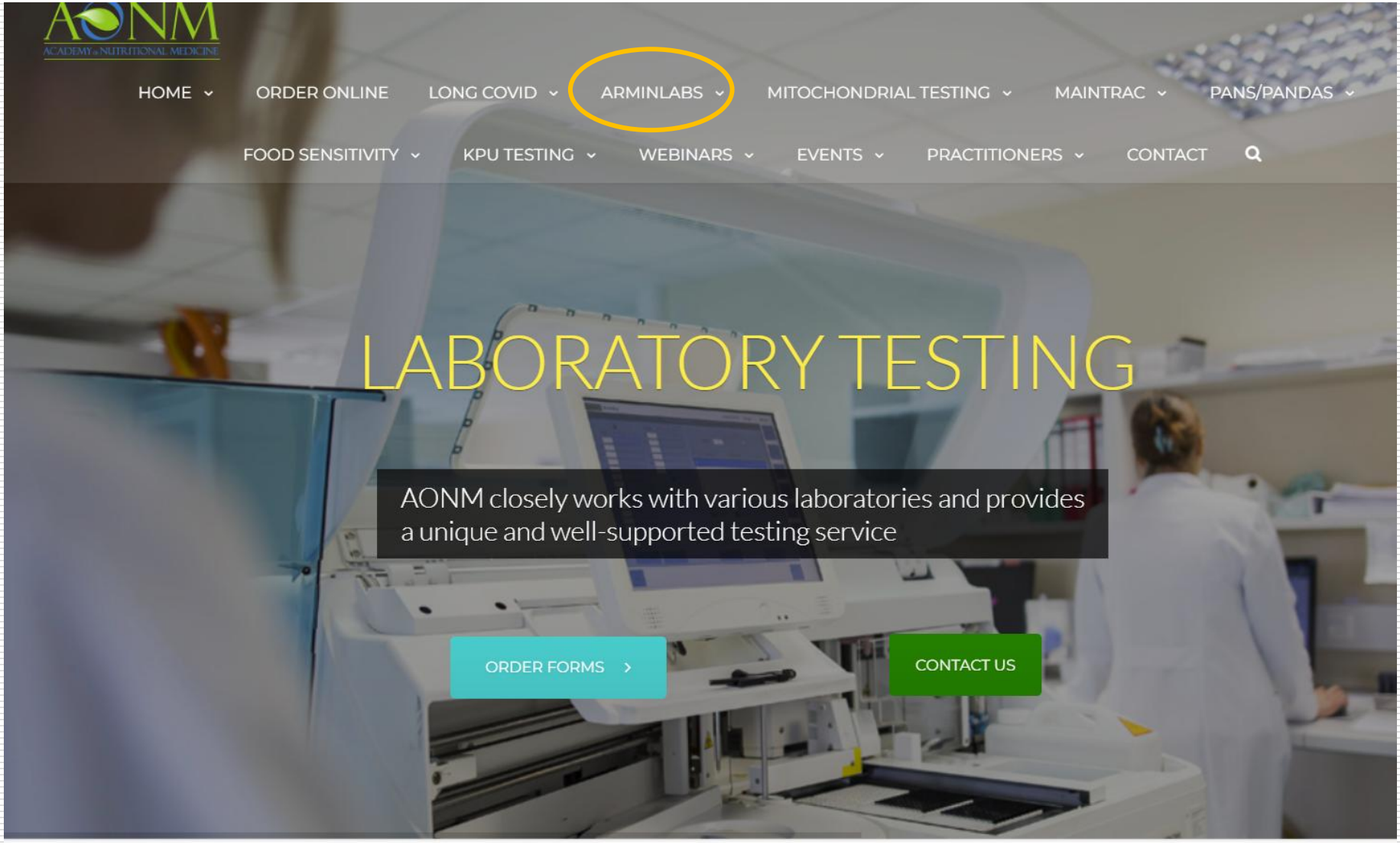
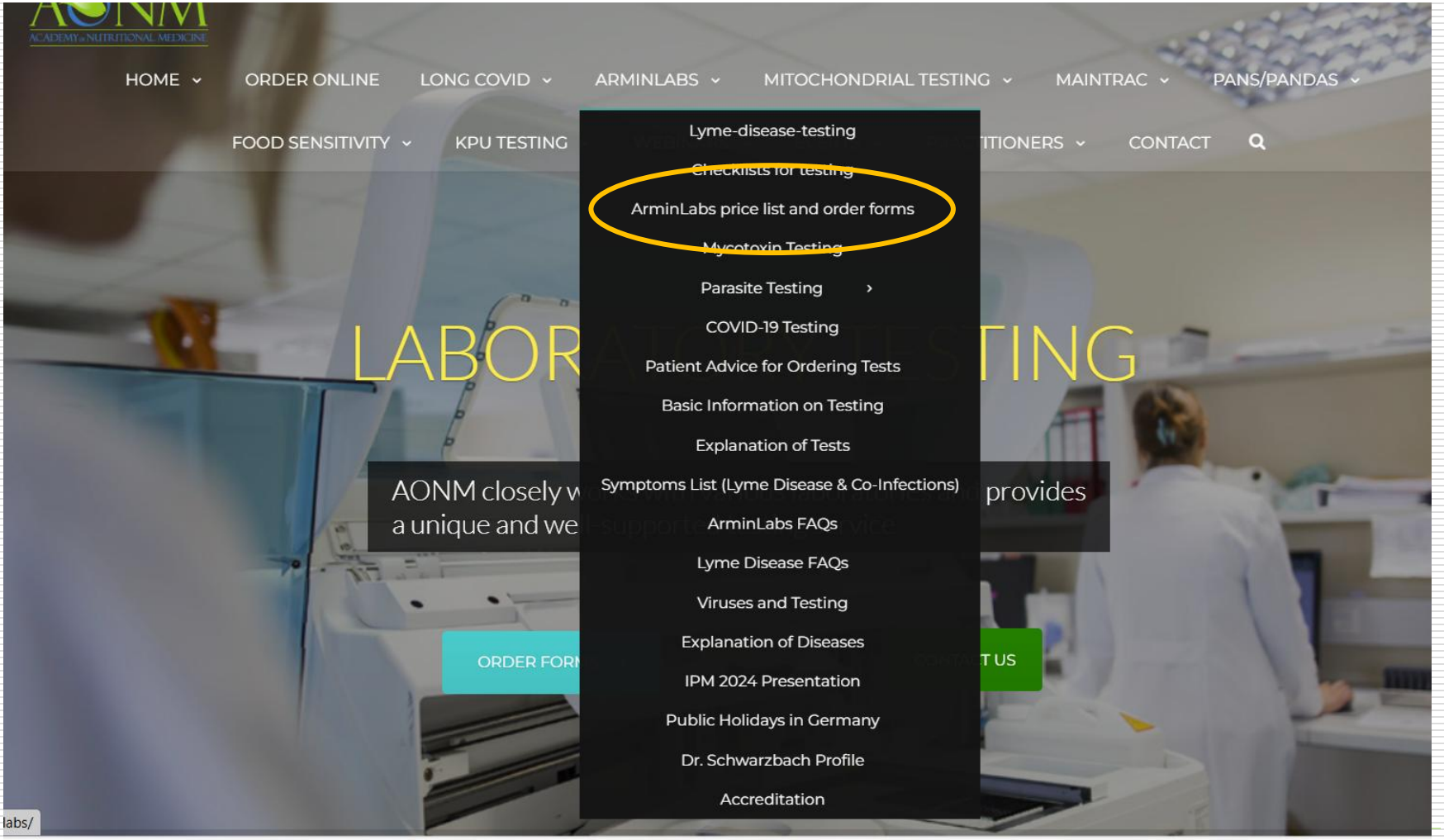
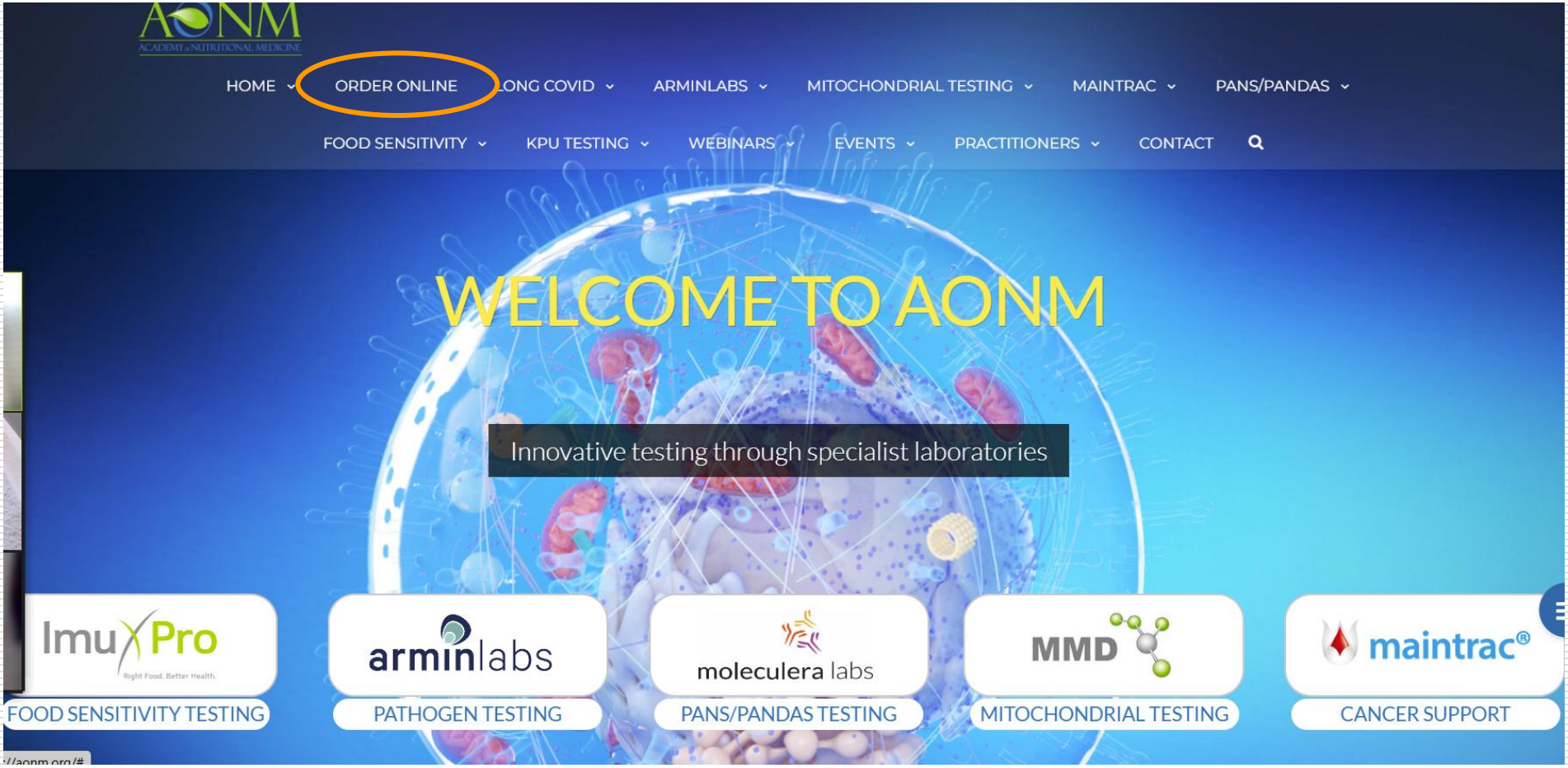
ArminLabs tab on www.aonm.org



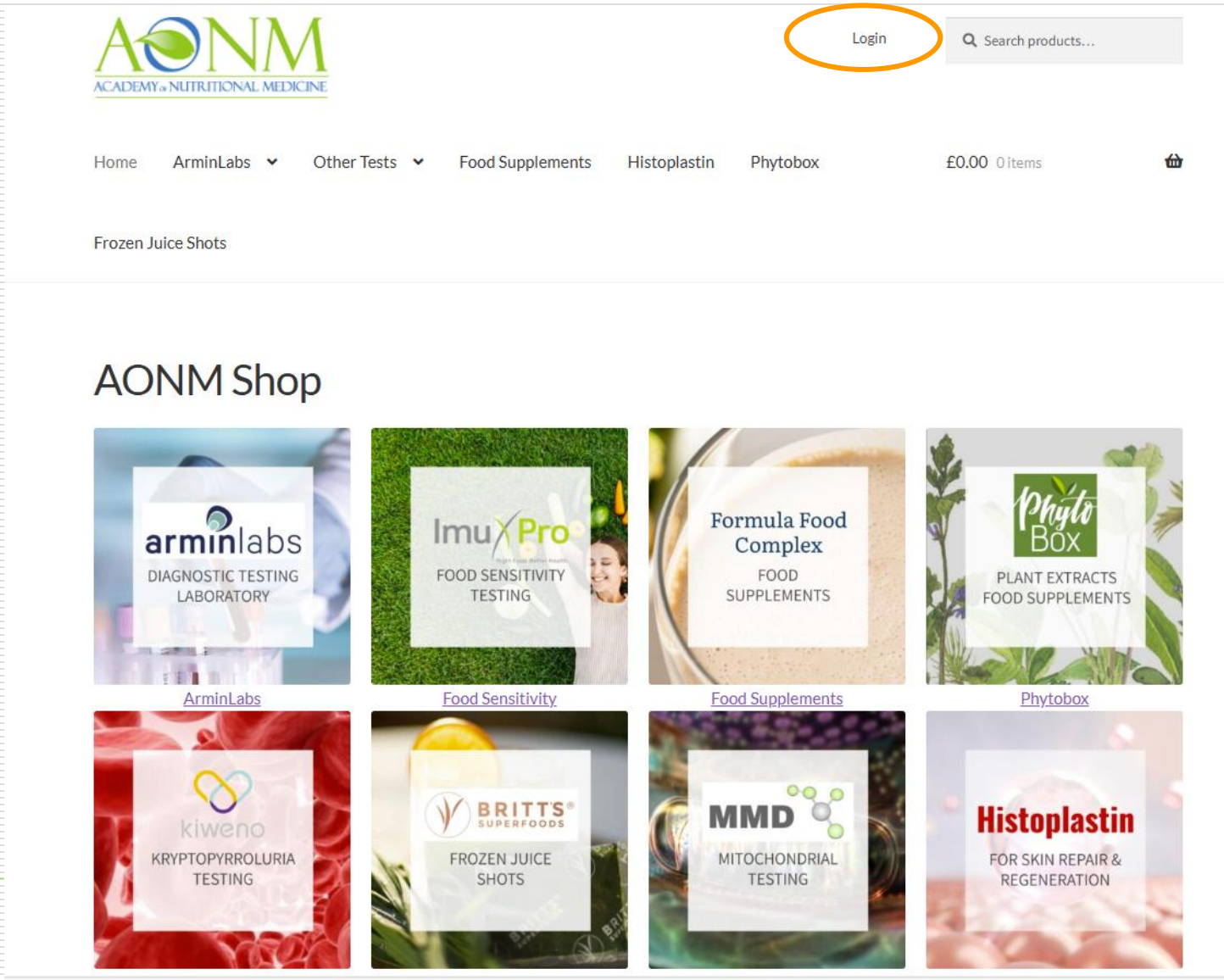
Dropdown with many submenus



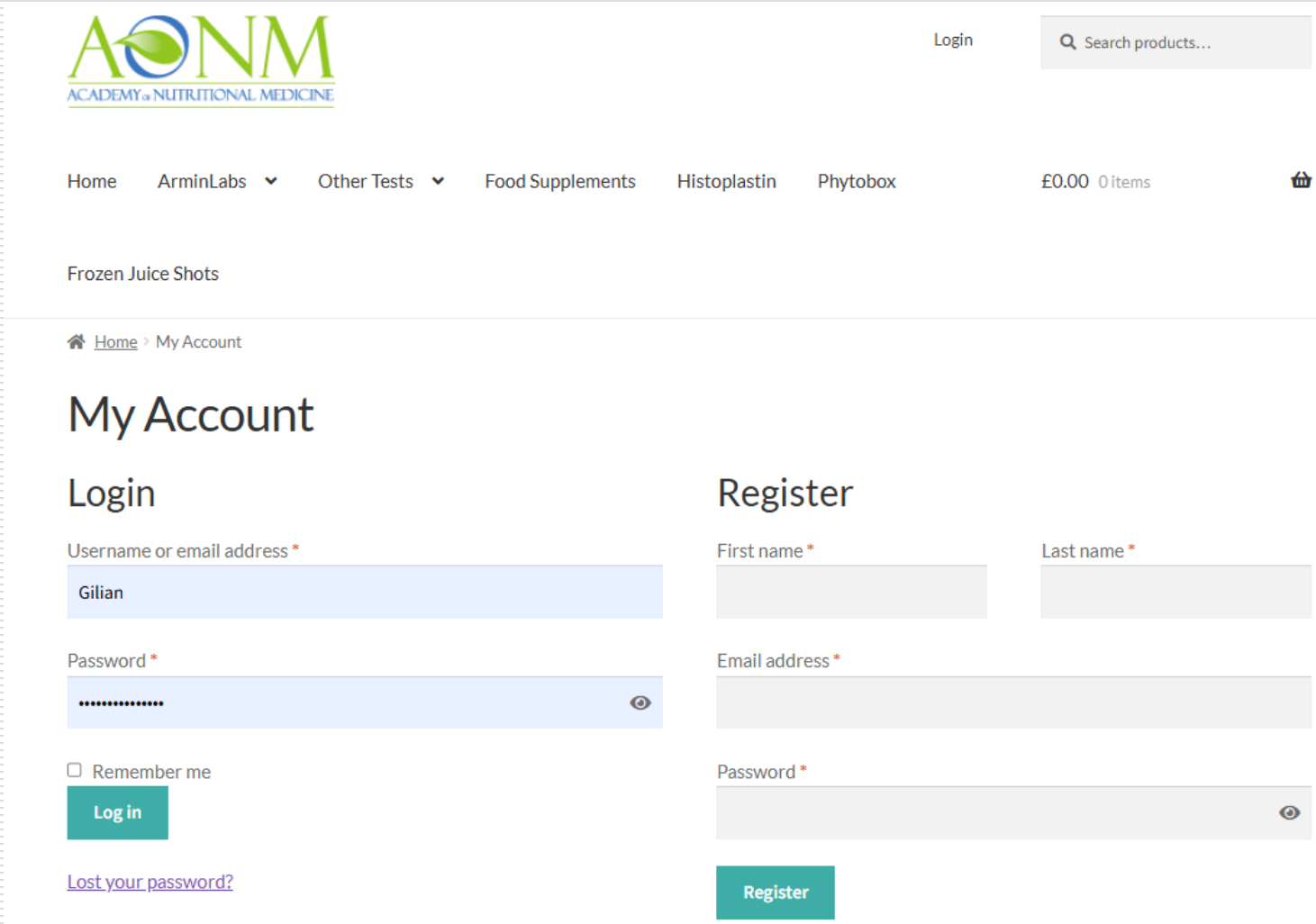
Option to order online: Click on that



Then click on "Login"



Then either open your account or register



Dr. Armin is in the UK 20th/21st June – Westminster/free access

EXH-20 will allow you to register at the members' rate of 20% off for a 1,2 or 3 day conference pass.

EXHIB-FREE will allow you to register for a pass to attend the workshops and exhibition free of charge.

ArminLabs testing with AONM

Thank you very much!
Q&A/Discussion

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