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Extractable nuclear antigens

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Extractable Nuclear Antigens are soluble cytoplasmic and nuclear components that are antibody targets with over 100 different antigens described.

The main 6 used in immunological laboratories for detection are **Ro**, **La**, **Sm**, **RNP**, **Scl-70** and **Jo1**,^[1] which are screened for by **Ouchterlony double immuno diffusion** techniques and confirmed by **Immuno blotting**. **Autoantibodies** to these antigens have particular associations with various connective tissue disorders.

On **anti-nuclear antibody** tests, they have a speckled pattern.^[2]

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Standard Process still uses Dr. Royal Lee's patented saline extraction method of obtaining nucleoprotein extracts from animal organs.

Terminology

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ENAs originally referred to proteins found in a saline extract of cell nuclei. Its components have since been more clearly identified and in fact include many cytoplasmic molecules. The misnomer however has stuck. These proteins are intimately associated with various RNA molecules and are thus called ribonucleoproteins, but the nomenclature used for them is often a source of confusion, Sm, Ro and La were named after the first 2 letters of the surnames of the patients in whom they were first found. Two proteins associated with Sjogren's Syndrome were independently described as antigens A and B, but are now known to be identical to Ro and La respectively. i.e. SS-A = Ro and SS-B = La.

ENA 4

[\[edit\]](#)

ENA 4 is a grouping of antibodies often used to screen for **mixed connective tissue disease** (MCTD), **Sjögren's syndrome** and **systemic lupus erythematosus** and commonly is composed of four tests:^[3]

- anti-Sm (for SLE)
- anti-RNP (for MCTD)
- anti-La (for Sjögren's)
- anti-Ro (for Sjögren's)


References

[\[edit\]](#)

- ↑ Prince HE, Hogrefe WR (1998). "Evaluation of a line immunoblot assay for detection of antibodies recognizing extractable nuclear antigens". *J. Clin. Lab. Anal.* **12** (5): 320–4. doi:10.1002/(SICI)1098-2825(1998)12:5<320::AID-JCLA13>3.0.CO;2-X . PMID 9773966 .
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- ↑ ENA 4 test (QUANTA Lite) product sheet. inovadx.com. URL: http://www.inovadx.com/Products/di_pdfs/708555/628555rEnglish.pdf ENA . Accessed on: November 5, 2007.

External links

[\[edit\]](#)

- [Extractable+Nuclear+Antigens](#)  at the US National Library of Medicine [Medical Subject Headings \(MeSH\)](#)



This *cell biology* article is a *stub*. You can help Wikipedia by *expanding it*.

V • T • E • Medical test: Antibodies: autoantibodies [hide]	
Anti-nuclear antibody	<i>PBC</i> : (Anti-gp210 · Anti-p62 · Anti-sp100 · · <i>ENA</i> : (Anti-topoisomerase/Scl-70 · Anti-Jo1 · ENA4 (Anti-Sm · Anti-nRNP · Anti-Ro · Anti-La · · · Anti-centromere · Anti-dsDNA ·
Anti-mitochondrial antibody	Anti-cardiolipin ·
Anti-cytoplasm antibody	Anti-neutrophil cytoplasmic (C-ANCA · P-ANCA · · Anti-smooth muscle (Anti-actin · · Anti-TPO/Antimicrosomal ·
Cell membrane	Anti-ganglioside · Anti-GBM ·
Extracellular	Anti-thrombin · Lupus anticoagulant · Gluten sensitivity: (Anti-transglutaminase (Anti-gliadin not autoantibody · · · <i>RA</i> (Rheumatoid factor/anti-IgG · Anti-citrullinated peptide · ·
Multiple locations	Anti-phospholipid · Anti-apolipoprotein ·
Ungrouped	Anti-glutamate receptor antibodies ·
M: LMC	cell/phys/auag/auab/comp, igrc imdf/ipig/hyps/tumr proc, drug(L3/4)

Categories: [Rheumatology](#) | [Cell biology stubs](#)

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Anti-nuclear antibody

From Wikipedia, the free encyclopedia



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Anti-nuclear antibodies (ANAs), also known as **anti-nuclear factor** or **ANF** are autoantibodies directed against contents of the cell nucleus.^[1]

They are present in higher than normal numbers in autoimmune disease. The ANA test measures the pattern and amount of autoantibody which can attack the body's tissues as if they were foreign material. Autoantibodies are present in low **titers** in the general population, but in about 5% of the population, their concentration is increased, and about half of this 5% have an **autoimmune disease**.^[*citation needed*]

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ANA test

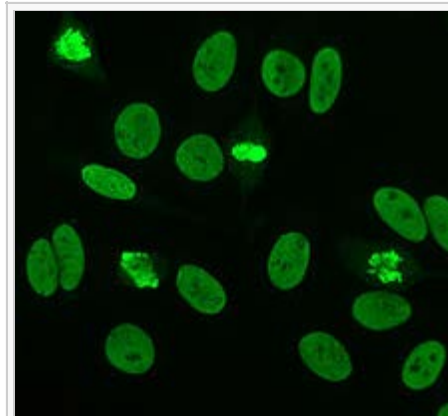
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One can check for the presence of ANAs in blood serum by means of a laboratory test. There are also additional tests that allow one to test for individual ANAs. The general ANA test is usually of two types: indirect **immunofluorescence** or **ELISA**.^[2]

Associated diseases

[\[edit\]](#)

The normal titer of ANA is 1:40 or less. **Higher titers are indicative of an autoimmune disease**. The presence of ANA is indicative of **lupus erythematosus** (present in 80-90% of cases), though they also appear in some other autoimmune diseases such as^[*citation needed*] **Sjögren's syndrome** (60%), **rheumatoid arthritis** (30-40%), **autoimmune hepatitis**, **scleroderma** and **polymyositis & dermatomyositis** (30%), and various non-rheumatological conditions associated with tissue damage. Other conditions with high ANA titre include^[*citation needed*] **Addison disease**,



Immunofluorescence staining pattern of double stranded DNA antibodies on HEP-

Idiopathic thrombocytopenic purpura (ITP), Hashimoto's, Autoimmune hemolytic anemia, Type I diabetes mellitus, Mixed connective tissue disorder (MCTD).

20-10 cells. Interphase cells show homogeneous nuclear staining while mitotic cells show staining of the condensed chromosome regions

Sensitivity

[[edit](#)]

The following table list the [prevalence](#) of different types of ANAs for different diseases, in this case what percentage of those with the disease have the ANA. Some ANAs appear in several types of disease, resulting in lower [specificity](#) of the test.

ANA type	Target antigen	Sensitivity (%)						
		SLE	Drug-induced LE	Diffuse systemic sclerosis	Limited systemic scleroderma	Sjögren syndrome	Inflammatory myopathy	MCTD
All ANAs (by indirect IF)	Various	>95	>95	70-90	70-90	50-80	40-60	95 ^[3]
Anti-dsDNA	DNA	40-60	-	-	-	-	-	.[3]
Anti-Sm	Core proteins of snRNPs	20-30	-	-	-	-	-	.[3]
Anti-histone	Histones	50-70	90 ^[3] - 95	-	-	-	-	.[3]
Anti Scl-70	Type I topoisomerase	-	-	28-70	10-18	-	-	.[3]
Anti-centromere	Centromeric proteins	-	-	22-26	90	-	-	.[3]
Anti-snRNP70	snRNP70	30 ^[4] -40 ^{[3][4]}	.[3]	15 ^[3]	10 ^[3]	.[3]	15 ^[3]	90 ^[3]
SS-A (Ro)	RNPs	30-50	-	-	-	70-95	10	.[3]
SS-B (La)	RNPs	10-15	-	-	-	60-90	-	.[3]
Jo-1	Histidine-tRNA ligase	-	-	-	-	-	25	.[3]

- = less than 5% sensitivity

Unless else specified in boxes, then ref is:^[4]

ANA classification

[[edit](#)]

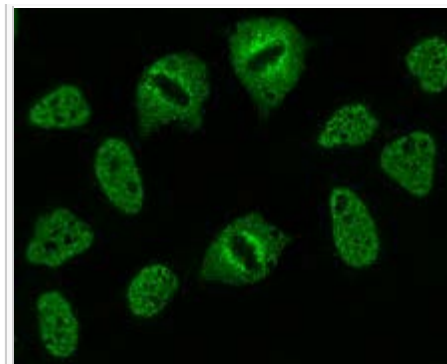
Following detection of a high titer of ANAs (e.g. 1:160), various subtypes are determined.^[5] This is typically done on cells of the *HEp-2* cell line. Examples include

- **Anti-ENA (Extractable nuclear antigen)**
 - Anti-Ro (SS-A)
 - Anti-La (SS-B)
 - Anti-Sm (*Smith* antigen)
 - Anti-nRNP (nuclear ribonucleoproteins)
 - Anti Scl-70 (topoisomerase I)
 - Anti-Jo

•

Anti-gp-210 (nuclear pore gp-210)

- Anti-p62 (Nucleoporin 62)
- Anti-dsDNA (double-stranded DNA)
- Anti-centromere



Speckled [Immunofluorescence](#) staining pattern of anti-nuclear antibodies on HEp-20-10 cells.

History

[[edit](#)]

The *LE cell* was discovered in [bone marrow](#) in 1948 by Hargraves *et al.*^[6] This was the first indication that processes affecting the cell nucleus were responsible for [lupus erythematosus](#) (LE).^[*citation needed*] In the 1950s, progressively more sensitive and specific ANA serology tests became available.

See also

[[edit](#)]

- Rheumatoid factor
- Anti-neutrophil cytoplasmic antibody (ANCA)

References

[[edit](#)]

- ↑ [Antinuclear+Antibody](#) at the US National Library of Medicine [Medical Subject Headings](#) (MeSH)
- ↑ Granito A, Muratori P, Quarneri C, Pappas G, Cicola R, Muratori L (January 2012). "Antinuclear antibodies as ancillary markers in primary biliary cirrhosis". *Expert Review of Molecular Diagnostics* **12** (1): 65–74. doi:10.1586/erm.11.82 . PMID 22133120 .
- ↑ [a](#) [b](#) [c](#) [d](#) [e](#) [f](#) [g](#) [h](#) [i](#) [j](#) [k](#) [l](#) [m](#) [n](#) [o](#) [p](#) [q](#) Table 6-2 in: Elizabeth D Agabegi; Agabegi, Steven S. (2008). *Step-Up to Medicine (Step-Up Series)*. Hagerstown, MD: Lippincott Williams & Wilkins. ISBN 0-7817-7153-6.
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- ↑ Kavanaugh A, Tomar R, Reveille J, Solomon DH, Homburger HA. *Guidelines for clinical use of the antinuclear antibody test and tests for specific autoantibodies to nuclear antigens*. *American College of Pathologists*. Arch Pathol Lab Med 2000;124:71-81. PMID 10629135 .
- ↑ Hargraves M, Richmond H, Morton R. *Presentation of two bone marrow components, the tart cell and the LE cell*. Mayo Clin Proc 1948;27:25–28.

External links

[[edit](#)]

- [Site with unique immunofluorescence images and slides -organ and non-organ specific](#)
- [Antinuclear+antibodies](#) at the US National Library of Medicine [Medical Subject Headings](#) (MeSH)

V • T • E •	Medical test: Antibodies: autoantibodies [hide]
Anti-nuclear antibody	<i>PBC</i> : (Anti-gp210 • Anti-p62 • Anti-sp100 • • <i>ENA</i> : (Anti-topoisomerase/Scl-70 • Anti-Jo1 • ENA4 (Anti-Sm • Anti-nRNP • Anti-Ro • Anti-La • • • Anti-centromere • Anti-dsDNA •
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Multiple locations	Anti-phospholipid • Anti-apolipoprotein •		
Ungrouped	Anti-glutamate receptor antibodies •		
M: LMC	cell/phys/auag/auab/comp, igrc	imdf/ipig/hyps/tumr	proc, drug (L3/4)

Categories: [Chemical pathology](#) | [Autoantibodies](#)

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