Elecsys® Anti-HAV II

Immunoassay for the qualitative detection of total antibodies against HAV

Summary

Hepatitis A is an acute, inflammatory liver disease caused by infection with the hepatitis A virus (HAV). HAV is a non-enveloped RNA virus in the family of picornaviruses. Of the 7 known genotypes, 4 can infect humans. Only one serotype of HAV has been documented[1-5].

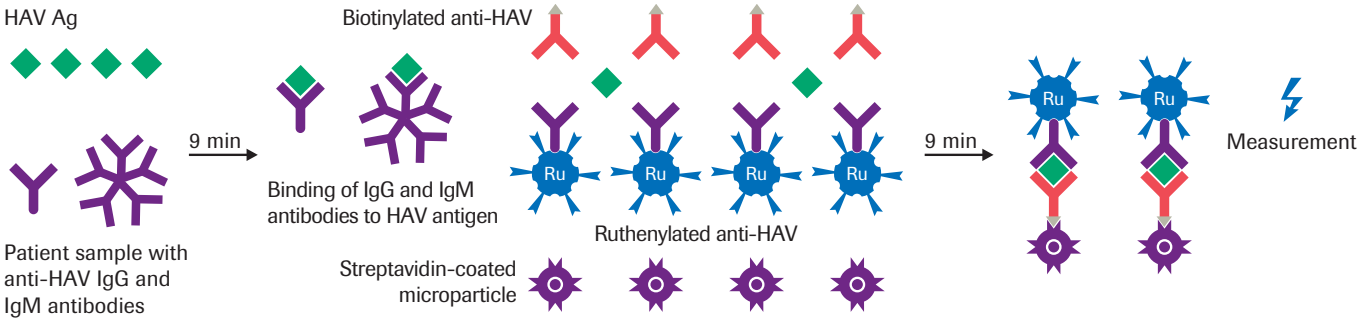
Hepatitis A occurs sporadically and in epidemics worldwide, with around 1.4 million new HAV infections reported each year[3,4]. HAV is transmitted fecal-orally either by person-to-person contact or ingestion of contaminated food or water in regions of low hygienic standards. Cooked foods can transmit HAV if the temperature during food preparation is inadequate to inactivate the virus or if food is contaminated through infected food handlers[1,4-6].

HAV has only been linked with acute hepatitis, and most patients fully recover within two months after infection. Only 10 – 15 % of people infected will have prolonged or relapsed illness for up to 6 months. Exposure to HAV creates lifelong immunity against future infection. HAV vaccines are available, which also stimulate active, lifelong immunity with 95 – 100 % efficiency[1-4].

Anti-HAV IgM becomes detectable 5 – 10 days before onset of symptoms, peaks during the symptomatic period and becomes undetectable in 75 % of patients 3 – 6 months after infection. Anti-HAV IgG, which appears after IgM, begins to rise at or right before the onset of clinical illness, peaks during the convalescent period, and persists to provide lifelong protection against the disease[3,7-10].

Elecsys® Anti-HAV II is an immunoassay for the in vitro qualitative detection of total (IgM and IgG) antibodies to HAV in human serum and plasma. It is used as an aid to detect a past or existing HAV infection or to determine the presence of antibody response to HAV in vaccine recipients[11].

Test principle: Inverted 2-step competitive assay (testing time: 18 minutes)



Step 1 (9 minutes):
20 µL/12 µL of the patient sample are incubated with HAV antigen in excess. Specific antibodies in the sample will bind to the added antigen. The higher the sample titer, the less antigen remains unbound.

Step 2 (9 minutes):
Biotinylated and ruthenylated anti-HAV antibodies are added, together with streptavidin-coated paramagnetic microparticles. Free epitopes on the HAV antigen bind to the added antibody conjugates, eventually forming immune complex containing ruthenium and biotin. The biotin part binds to microparticles.

Step 3 (measurement):
The reagent mixture is transferred to the measuring cell, where the microparticles are fixed to the electrode surface by magnetic action. The unbound substances are subsequently removed. Luminescence is then induced by applying a voltage and measured with a photomultiplier. The signal yield with increasing anti-HAV titer has a hyperbola-like characteristic.

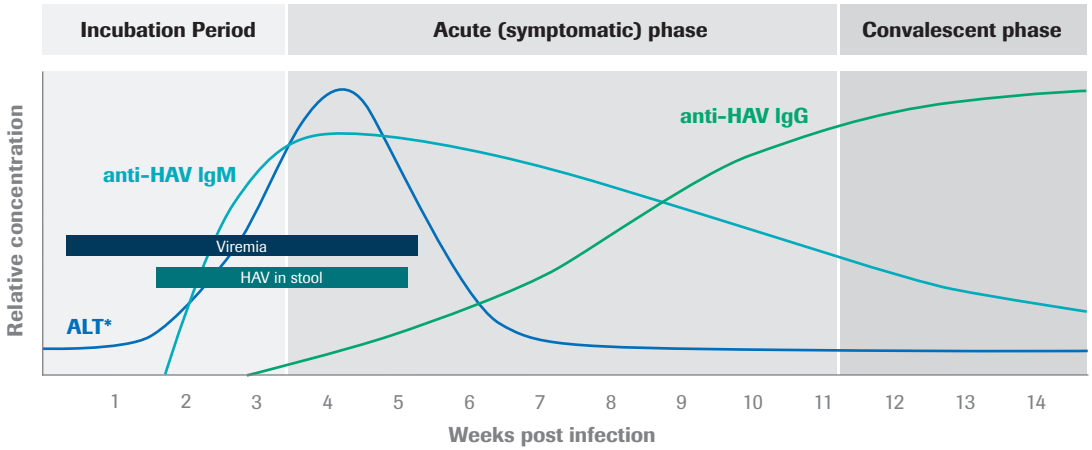
cobas®

Elecsys® Anti-HAV II assay characteristics[11]

Systems	**cobas e** 411 analyzer **cobas e** 601 / **cobas e** 602 modules	**cobas e** 402 / **cobas e** 801 analytical units
Testing time	18 minutes	
Test principle	Inverted 2-step competitive assay	
Calibration	2-point	
Interpretation	COI >1.0 = non-reactive (negative for HAV-specific antibodies) COI ≤1.0 = reactive (positive for HAV-specific antibodies)	
Traceability	Traceable to the "Second International Standard for Anti-Hepatitis A, immunoglobulin, human", NIBSC code 97/646 of the NIBSC (National Institute for Biological Standards and Control) via method comparison to the first generation Elecsys® Anti-HAV assay as reference.	
Sample material	Serum collected using standard sampling tubes or tubes containing separating gel. Li-heparin, Na-heparin, K_2-EDTA, K_3-EDTA, ACD, CPD, CP2D, CPDA and Na-citrate plasma. Plasma tubes containing separating gel can be used.	
Sample volume	20 µL	12 µL
Onboard stability	8 weeks	16 weeks
Intermediate precision in positive samples	**cobas e** 411 analyzer: CV 1.3 – 3.2 % **cobas e** 601 / 602 modules: CV 1.8 – 3.3 %	CV 2.0 – 3.5 %
Relative sensitivity	Subjects vaccinated against hepatitis A (N = 238): 100 % (99.45 – 100 %*) Subjects with acute hepatitis A infection (N = 234): 100 % (98.44 – 100 %) Subjects recovered from hepatitis A infection (N = 256): 100 % (98.57 – 100 %)	
Relative specificity	Blood donors (N = 577): 99.48 % (98.49 – 99.89 %) Subjects with routine request for anti-HAV testing (N = 871): 99.66 % (99.00 – 99.93 %)	

*95 % confidence interval (2-sided)

Hepatitis A infection: marker profile after natural infection[3,7-10,12]

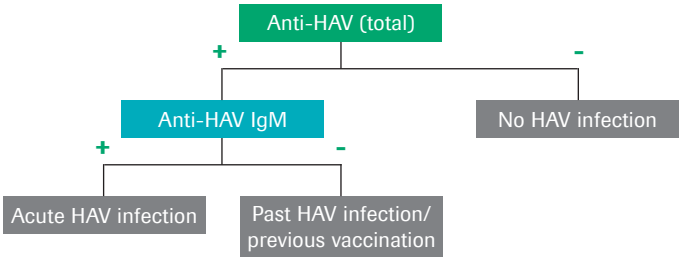


*alanine aminotransferase

Proposed algorithms for diagnosis of HAV infection

Unkown HAV immune status

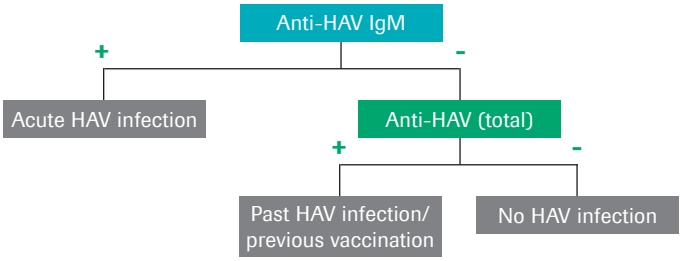
- The patient may have an acute or past HAV infection, or may not be immune
- Initial test – anti-HAV (total assay)



With this algorithm, all three possible outcomes can be identified by testing first with the anti-HAV (total) assay followed by the anti-HAV IgM assay if necessary. By contrast, an HAV IgG assay alone cannot identify or exclude acute infection; an HAV IgM test is also required.[10,13]

Suspected acute HAV infection

- The patient is exhibiting clinical symptoms
- Initial test – anti-HAV IgM assay



With this algorithm, all three possible outcomes can be clearly identified by testing first with the anti-HAV IgM assay followed by the anti-HAV (total) assay if necessary.[10,13,14]

Order information

Product	Material configuration	Material Number
Elecsys® Anti-HAV II[a)]	100 tests	08 086 630 190
Elecsys® Anti-HAV II[b)]	300 tests	08 086 664 190
PreciControl Anti-HAV II[a),b)]	8 × 1.3 mL each	08 086 672 190

*a) On **cobas e** 411 analyzer, **cobas e** 601 / **cobas e** 602 module, b) On **cobas e** 402 / **cobas e** 801 analytical units*

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