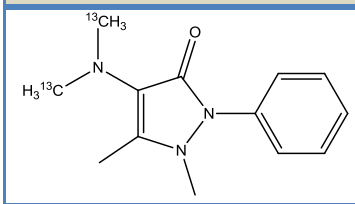
^{13}C-Aminopyrine Breath Test

^{13}C-Aminopyrine	
	Molecular weight: 233.29 g/mol Enrichment: 99 % Labeled C-atoms: 2 Dosage: 75 mg

Metabolism

^{13}C-Aminopyrine undergoes a two-step N-demethylation by cytochrome P-450 monooxygenases including CYP2C19, CYP1A2 and CYP3A4, yielding formaldehyde and amino-antipyrine[1]. The formaldehyde is further oxidized to bicarbonate and exhaled as $^{13}CO_2$, or deposited in the bicarbonate pool[2]. As N-demethylation occurs exclusively in the liver with a low extraction rate, aminopyrine metabolism reflects the efficiency of aminopyrine metabolism[3]. It is therefore a good measure of hepatic metabolic capacity, i.e. the “functional hepatic mass”.

Applications of ^{13}C-Aminopyrine Breath Test

The ^{13}C-Aminopyrine Breath Test is very useful for quantitative assessment of liver function in conditions such as established chronic hepatitis and cirrhosis[4,5]. It can be used for example in Hepatitis C patients to quantify progression of the disease[6].

The patient should have fasted for 8 hours prior to the test. Smoking should also be avoided at least one hour prior to the test [7]. The patient should not drink carbonated water or soft drinks prior to the test since that might interfere with the results. In addition, oxygen supplementation should be avoided because increased oxygen content in exhaled breath can influence $^{13}CO_2$ measurement by NDIRS [8].

Test Performance Procedure (see IRIS® Operating Manual for additional information).

1. Collect zero (basal) breath sample as described in manual.
2. Patient takes ^{13}C-Aminopyrine (75 mg) dissolved in warm water (100 ml).
3. Collect additional breath samples as shown below (Table 1).
4. Analyze all 10 breath samples with IRIS®-3.

#1 Bag	#2 Bag	#3 Bag	#4 Bag	#5 Bag	#6 Bag	#7 Bag	#8 Bag	#9 Bag	#10 Bag
0 min	10 min	20 min	30 min	40 min	50 min	60 min	80 min	100 min	120 min

Table 1: ^{13}C-Aminopyrine Breath Test Sample Collection

Results and interpretation

Typical results for the ^{13}C-Aminopyrine Breath Test are presented in Figures 1 to 4. The ^{13}C-Aminopyrine test is very sensitive and precise, as can be seen from the very narrow “normal” range. This makes it possible to detect even patients with early stage liver disease [6,9,10].

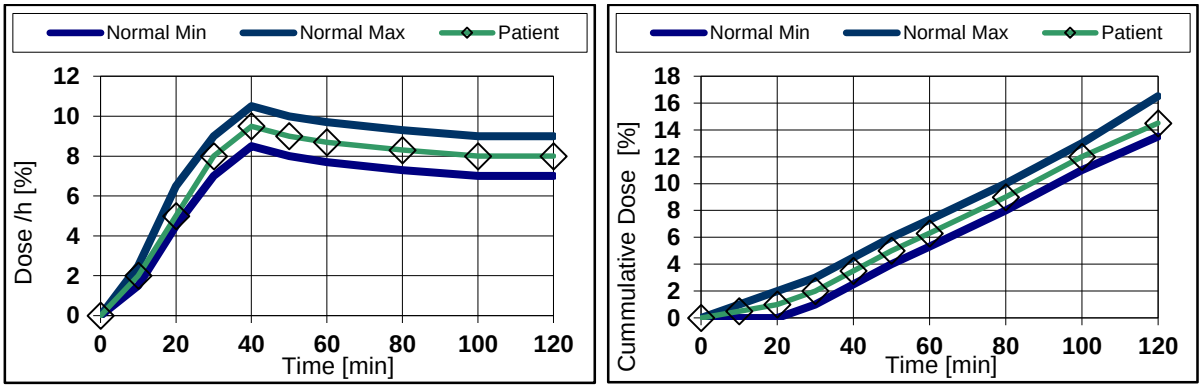


Fig. 1,2: ^{13}C-Aminopyrine Breath Test, Dose/h curve and % Cum Dose curve, healthy (normal) subject [11]

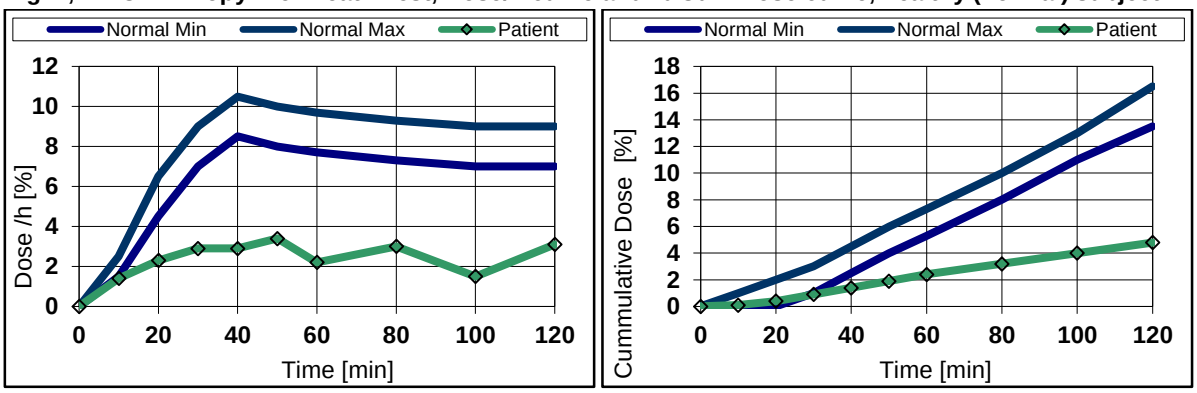


Fig. 3,4: ^{13}C-Aminopyrine Breath Test, Dose/h curve and % Cum Dose curve, subject with liver disease [11]

For the ^{13}C-Aminopyrine Breath Test, cut-off values have been established in a study with 135 patients [11] (see table below).

Condition	dose/hr (‰) at 30 min	% cum. dose at 120 min
Fibrosis stages 0/1/2	6.62 - 7.10 ± 2.9	9.21 - 10.06 ± 3.8
Fibrosis stages 3 / 4	2.48 - 3.13 ± 1.2	3.62 - 4.56 ± 2.0
Cirrhosis**,** not established	6.77 ± 2.7	9.63 ± 3.6
Cirrhosis**,** established	2.48 ± 1.2	3.68 ± 1.9

Table 2: Cut-off values for ^{13}C-Aminopyrine Breath Test [11]

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