

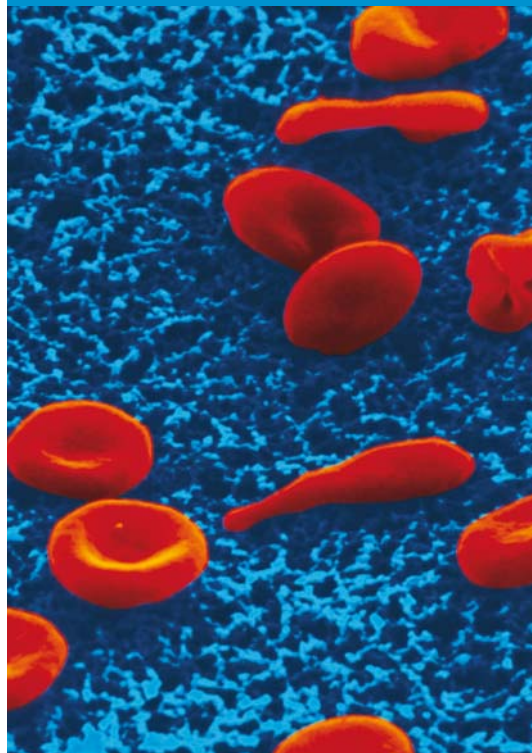
# AxSYM<sup>®</sup> Active-B12

(holotranscobalamin)

Measures the bio-available form of  
vitamin B<sub>12</sub>

An early marker of changes in B<sub>12</sub> status

Direct, automated method



AXIS-SHIELD



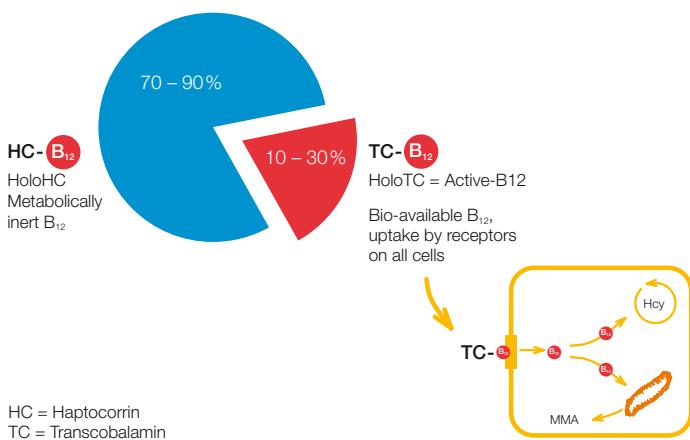
## Laboratory Diagnosis of Vitamin B<sub>12</sub> Deficiency

For the investigation of suspected vitamin B<sub>12</sub> deficiency, measurement of serum vitamin B<sub>12</sub> is the standard test. However, the test has the following limitations:

- It measures total, not metabolically active vitamin B<sub>12</sub>
- The levels are not clearly correlated with clinical symptoms
- There is a large “grey-zone” or indeterminate range between normal and abnormal levels
- Clinically significant vitamin B<sub>12</sub> deficiency can occur with total vitamin B<sub>12</sub> levels in the apparently normal range

## What is Active-B12 (holotranscobalamin)?

### Not all vitamin B<sub>12</sub> in serum is bio-available



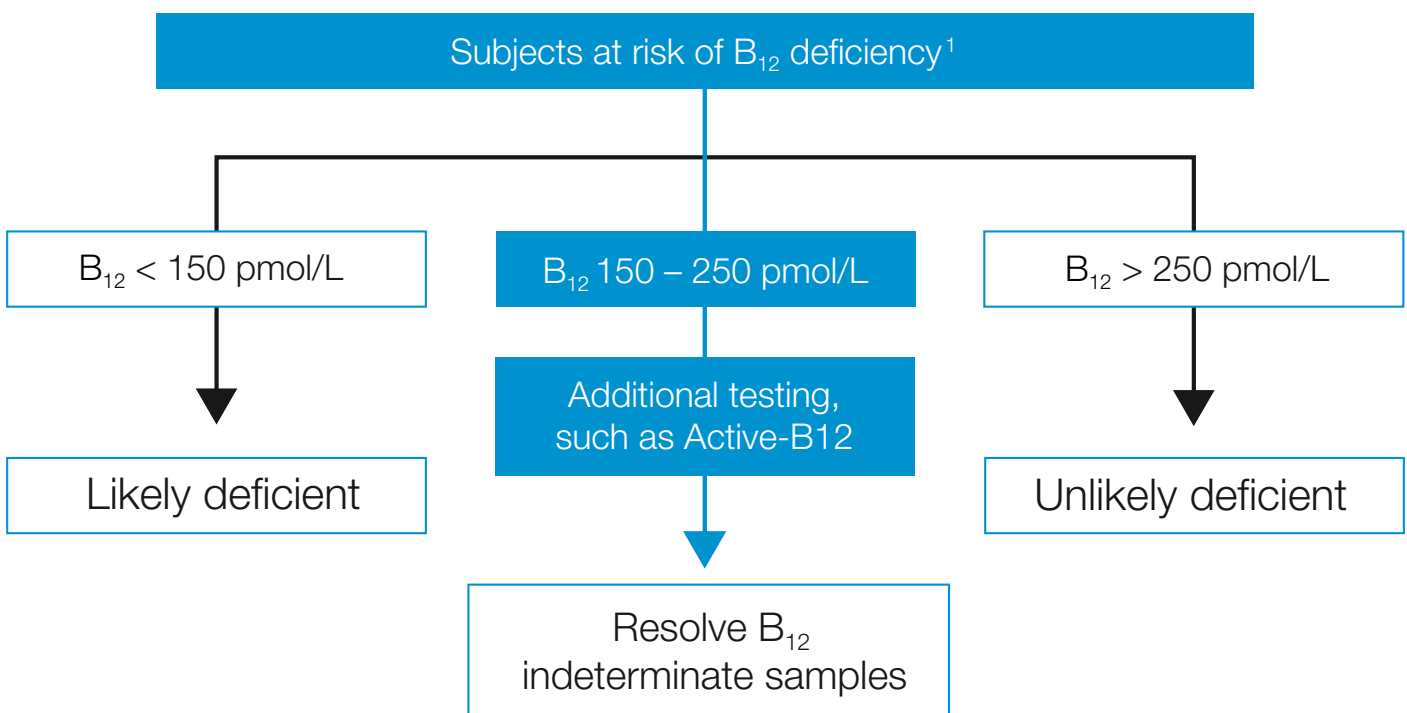
Vitamin B<sub>12</sub> (cobalamin) in serum is bound to two proteins, transcobalamin (TC) and haptocorrin (HC). The transcobalamin-cobalamin complex is called holotranscobalamin (HoloTC) or Active-B12.

The much larger fraction (about 80%) of cobalamin carried by HC is considered metabolically inert because no cellular receptors exist, except on the liver.

**Active-B12 contains the biologically available cobalamin because only transcobalamin-bound B<sub>12</sub> promotes the uptake of the cobalamin therein by all cells, via specific receptors.**

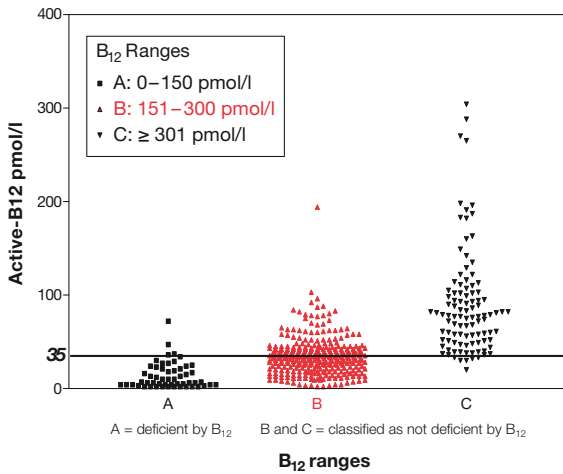
The markedly shorter half-life for Active-B12 compared to HoloHC makes a decrease of Active-B12 one of the earliest markers of cobalamin deficiency.

## Recently Proposed Algorithm for B<sub>12</sub> Deficiency Subjects



# Clinical Studies with Active-B12 (holotranscobalamin)

## Active-B12 results by vitamin B<sub>12</sub> concentration



B<sub>12</sub> cut-off 156 pmol/L  
Active-B12 cut-off = 35 pmol/l

Active-B12 and total B<sub>12</sub> show good agreement at the extremes, i.e. very likely deficient or not deficient. There is an indeterminate zone between approximately 151–300 pmol/L total B<sub>12</sub> where there is likely to be misclassification of B<sub>12</sub> status if relying on total serum B<sub>12</sub> alone.

Active-B12 may be useful in earlier identification of persons at risk of developing B<sub>12</sub> deficiency.

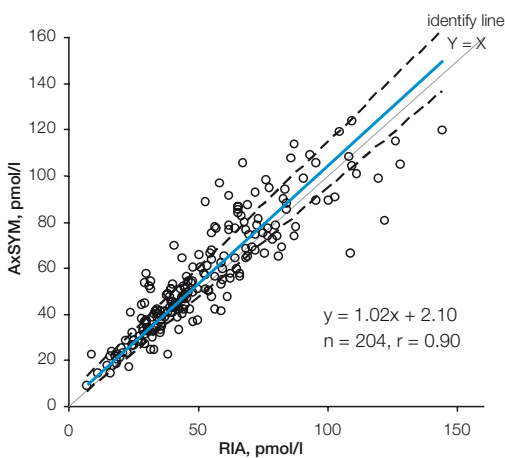
Data provided by Prof. W Herrmann, Zentrallabor der Universitätskliniken des Saarlandes, Homburg, Germany

Methods based on specific anti-TC antibodies confirm the usefulness of Active-B12 for diagnosing B<sub>12</sub> deficiency<sup>2, 3</sup>. A number of studies have been published to support the contention that Active-B12 would be a better indicator of early vitamin B<sub>12</sub> deficiency than total serum cobalamins<sup>4, 5, 6</sup>.

- Active-B12 levels are low in patients with biochemical signs of vitamin B<sub>12</sub> deficiency<sup>7</sup>.
- Low values have been reported in both vegetarians<sup>8, 9</sup>, vegans<sup>10</sup>, and in populations with a low intake of vitamin B<sub>12</sub><sup>11</sup>.
- A low serum Active-B12 (but not serum vitamin B<sub>12</sub>) was reported in patients with Alzheimer's disease compared to a healthy control group<sup>12</sup>.
- Recent results also support that Active-B12 reflects vitamin B<sub>12</sub> status independent of recent absorption of the vitamin<sup>13</sup>.

## AxSYM Active-B12 (holotranscobalamin) Assay

### Method Comparison AxSYM to Axis-Shield Active-B12 Radioimmunoassay



The AxSYM Active-B12 assay is based on two well characterised binders: A monoclonal antibody to Active-B12 (that does not recognize transcobalamin, TC) and a monoclonal antibody to TC.

The assay directly quantitates Active-B12 and avoids the sample pre-treatment step common to all vitamin B<sub>12</sub> assays.

The new AxSYM Active-B12 assay correlates well to the existing RIA method.

Sample range for RIA 7.1–144.3 pmol/L and 8.9–123.3 pmol/L for AxSYM

## AxSYM Active-B12 (holotranscobalamin) Assay Characteristics

<b>Method</b>	Microparticle Enzyme Immunoassay (MEIA)
<b>Throughput</b>	Up to 45 tests/hour
<b>Sample Type</b>	Serum (including gel tubes), lithium heparin plasma (including gel tubes)
<b>Sample Preparation</b>	None
<b>Sample Volume</b>	173 µl
<b>Calibrators</b>	6, recombinant Active-B12 in buffer, liquid, ready-to-use 0, 8, 16, 32, 64, 128 pmol/l
<b>Controls</b>	2, recombinant Active-B12 in serum, liquid, ready-to-use
<b>Expected Values</b>	19.1 – 119.3 pmol/l (apparently healthy population, n = 281)
<b>Suggested Cut-off</b>	35 pmol/l
<b>Precision (total %CV)</b>	< 10%
<b>Calibration Curve Stability</b>	Typically 14 days
<b>Limit of Detection</b>	≤ 1 pmol/l
<b>Reference Method</b>	Axis-Shield radio-immunoassay

## Ordering Information

Description	List Number
AxSYM HoloTC Reagent Kit	3L83-20
AxSYM HoloTC Calibrator Kit	3L83-01
AxSYM HoloTC Control Kit	3L83-10
AxSYM HoloTC Assay Disk	3L84-01 or higher

## References

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