### Overview

<table>
<thead>
<tr>
<th>Product name</th>
<th>NAD/NADH Assay Kit (Colorimetric) ab65348 provides a convenient and sensitive tool to quantify NAD⁺ and NADH, and measure their ratio, in samples from mammals and other species.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection method</td>
<td>Colorimetric</td>
</tr>
<tr>
<td>Sample type</td>
<td>Urine, Serum, Cell Lysate, Tissue Lysate</td>
</tr>
<tr>
<td>Assay type</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Range</td>
<td>400 nM - 2000 nM</td>
</tr>
<tr>
<td>Assay time</td>
<td>2h 00m</td>
</tr>
</tbody>
</table>

#### NAD / NADH assay protocol summary:
- extract samples from cells / tissues with extraction buffer and deproteinize with spin column
- for NADH measurement, heat samples to 60°C for 30 min to decompose NAD⁺, cool on ice (this step not necessary for measurement of total NAD⁺/NADH)
- add samples and standards to wells
- add reaction mix and incubate for 5 min at room temp to convert NAD to NADH
- add NADH developer and incubate for 1-4 hrs while reaction cycles
- analyze with microplate reader multiple times during the 1-4 hr incubation
- reaction can be stopped with stop solution.

### Notes

This product is manufactured by BioVision, an Abcam company and was previously called K337 NAD/NADH Quantitation Colorimetric Kit. K337-100 is the same size as the 100 test size of ab65348.

This assay specifically detects NAD and NADH, but not NADP nor NADPH.

If you would like to use a fluorometric reading, please refer to NAD/NADH Assay Kit (Fluorometric) (ab176723).
NAD/NADH Assay kit [ab221821](https://www.abcam.com/nad-nadh-assay-kit-ab221821) uses an alternative assay method that relies on purification of NAD and NADH from samples and may be more sensitive in some samples.

Review our [Metabolism Assay Guide](https://www.abcam.com/metabolism-assays) to learn about assays for metabolites, metabolic enzymes, mitochondrial function, and oxidative stress, and also about how to assay metabolic function in live cells using your plate reader.

How other researchers have used NAD/NADH Assay Kit ab65348

This NAD/NADH assay kit has been used in publications in a variety of sample types, including:

- Human: primary blood mononuclear cells\(^1\), epithelial ovarian cancer cells\(^2\), Jurkat cells\(^3\)
- Mouse: cell culture lysates\(^4\), cardiomyocyte cell culture lysates\(^5\), liver\(^6\), liver and muscle\(^7\), primary hepatocyte cell cultures\(^8\), aorta tissue\(^9\)
- Rat: brain tissue\(^10\)
- Locust: thoracic muscle\(^11\)
- Bacteria: Z. mobilis\(^12\), E. coli\(^13\)


Abcam has not and does not intend to apply for the REACH Authorisation of customers’ uses of products that contain European Authorisation list (Annex XIV) substances. It is the responsibility of our customers to check the necessity of application of REACH Authorisation, and any other relevant authorisations, for their intended uses.

**Platform**

Microplate reader

**Properties**

**Storage instructions**

Store at -20°C. Please refer to protocols.

<table>
<thead>
<tr>
<th>Components</th>
<th>100 tests</th>
<th>2000 tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycling Buffer I</td>
<td>1 x 15ml</td>
<td>20 x 15ml</td>
</tr>
<tr>
<td>NAD Cycling Enzyme Mix</td>
<td>1 vial</td>
<td>20 vials</td>
</tr>
<tr>
<td>Developer Solution II</td>
<td>1 vial</td>
<td>20 vials</td>
</tr>
<tr>
<td>NADH Standard II</td>
<td>1 vial</td>
<td>20 vials</td>
</tr>
<tr>
<td>Extraction Buffer II</td>
<td>1 x 50ml</td>
<td>20 x 50ml</td>
</tr>
<tr>
<td>Stop Solution II</td>
<td>1 x 1.2ml</td>
<td>20 x 1.2ml</td>
</tr>
</tbody>
</table>

**Relevance**

NAD (nicotinamide adenine dinucleotide) is a coenzyme in metabolic redox reactions, a precursor for several cell signaling molecules, and a substrate for protein posttranslational modifications. NAD is a dinucleotide, consisting of two nucleotides joined through their phosphate groups: with one nucleotide containing an adenosine ring, and the other containing nicotinamide. In metabolism, NAD is involved in redox reactions, carrying electrons from one reaction to another. The coenzyme is therefore found in two forms in cells: NAD is an oxidizing agent — it
accepts electrons from other molecules and becomes reduced, forming NADH, which can then be used as a reducing agent to donate electrons. These electron transfer reactions are the main function of NAD. However, it is also used in other cellular processes, the most notable one being a substrate of enzymes that add or remove chemical groups from proteins in posttranslational modifications.

Images

NADH/NAD+ ratio in soleus muscle measured using ab65348. p < 0.05 when comparing (+) HFD and LFD, (*) HFD + TQ and HFD, and (#) LFD and LFD + TQ using independent t-tests. Results are means ± SEM (n = 8-10 mice per treatment group). LFD: low fat diet, HFD: high fat diet, TQ: thymoquinone.

NAD/NADH was measured in K562 ME2 knockdown cells (pLKO - empty vector; shME2-2 & shME2-3 - two selected knockdown clones). Data are expressed as mean ± SD, n=3. NAD/NADH Ratio is calculated as described in the product protocol. Image obtained from Ren JG et al; PLOS one, 2010; 5(9): e12520 (DOI:10.1371/journal.pone.0012520)
NAD and NADH (tNAD) or NADH alone measured cell lysates. 5e6 cells were lysed in 1 mL, spin filtered, and tested neat or 1/5 (duplicates +/- SD).

Standard curve with background signal subtracted (duplicates; +/- SD).

NADH Standard calibration curve. Quantification of NAD (diamond) and NADH (open square) following product protocol and using NADH standard provided in the kit. No NADP (triangle) was detected in this reaction. Standard curve range: 20-100 pmol.
Please note: All products are "FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES"

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