

DATASHEET



LYOPHILIZED TUBULIN

Catalog Number	Mass	Quantity
142001 - 1 mg	3 mg total powder	1 mg tubulin protein
142001 - 10 mg	30 mg total powder	10 mg tubulin protein

STORE IN A COOL,
DRY ENVIRONMENT

For research use only.

Shipping: shipped at ambient temperatures

Molecular Weight: ~110 kDa

Storage Conditions: store in cool, dry environment

Purity: >99% (SDS-PAGE)

Form: desiccated powder (1 mg tubulin protein is supplied as 3 mg powder with extra mass attributed to trehalose, a lyoprotectant)

Buffer Conditions Upon Reconstitution: 10 mM Sodium Phosphate, 0.5 mM MgCl₂, 0.1 mM GTP, and 0.25 M Trehalose (pH 7.0)

Source: bovine

Shelf Life: check product label for expiration date

Background

Tubulin, a highly conserved cytoskeletal protein, is required for several essential eukaryotic processes including intracellular transport, intercellular signaling, extracellular sensing, cell migration, and cell division. Tubulin (110 kDa) is a heterodimer of α - and β -tubulin (each 55 kDa), and polymerizes into higher order filaments termed microtubules. Microtubules measure 25 nm in diameter and have a persistence length of ~2 μ m, incorporating ~1650 tubulin subunits per 1 μ m. Given the asymmetry of tubulin dimers, microtubules have inherent polarity with distinct "+" (β -tubulin exposed) and "-" (α -tubulin exposed) ends. Another critical feature of microtubules is their dynamic instability, a consequence of the GTPase activity of tubulin. This property confers force-generating capabilities to microtubules that are critical for cell division. For this reason, tubulin is a powerful target for the therapeutic intervention of neoplastic diseases such as cancers.

Material

Lyophilized Tubulin is isolated by selective precipitation from bovine brain homogenate by an adaptation of the method of Andreu (2007) and lyophilized by an adaptation of the method of Dráberová et al. (2010). The resulting tubulin protein is >99% pure (Figure 1) and polymerization competent (Figure 2). Lyophilized Tubulin is supplied as a white powder. When reconstituted with ultrapure water to 40 mg/ml, the buffer conditions are 10 mM Sodium Phosphate, 0.5 mM MgCl₂, 0.1 mM GTP, and 0.25 M Trehalose, pH 7.0. Note that 1 mg tubulin protein is supplied as 3 mg powder (extra mass attributed to trehalose, a lyoprotectant), and reconstitution/dilution should be based on the tubulin protein concentration.

Storage and Handling

Store Lyophilized Tubulin in a cool, dry environment. The product is stable under these conditions for 1 year. Reconstitute the lyophilized tubulin protein by resuspending in ice-cold 1X Tubulin PEM Buffer (Cat. No. 032003; 80 mM PIPES, 1 mM EGTA, and 1 mM MgCl₂, pH 6.8) to 40 mg/ml and incubating on ice for 15 minutes. Clarify the reconstituted tubulin to remove any protein aggregates by centrifuging at 14k rpm (21k x g) for 1 minute at 4°C. If desired, reconstituted Lyophilized Tubulin can be aliquoted into smaller experimental batches, frozen in liquid Nitrogen, and stored at -80°C. Avoid repeated freeze-thaw cycles. Note that 1 mg tubulin is supplied as 3 mg powder (extra mass attributed to trehalose, a lyoprotectant), and



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reconstitution/dilution should be based on the tubulin protein concentration. View detailed storage and handling instructions at <https://puresoluble.com/storage-and-handling-lyophilized-tubulin/>.

Activity and Applications

Lyophilized Tubulin will polymerize into microtubules when supplemented with guanosine-5'-triphosphate (GTP), warmed to 37 °C, and kept above its critical concentration. Polymerization activity is detectable in a variety of experimental systems including fluorescence microscopy assays, turbidity assays, and GTPase assays. Lyophilized Tubulin is suitable for use in a variety of cell-free experimental applications, and can be combined with fluorescent or biotinylated tubulin proteins in generating microtubules *in vitro*. Visit www.PureSoluble.com/protocols for common microtubule polymerization protocols, including the generation of short, rigid microtubules stabilized by GMPCPP or long, flexible microtubules stabilized by taxol.

- structural analysis by X-ray crystallography and electron microscopy
- drug discovery by high-throughput screening
- *in vitro* biochemical and biophysical approaches

Figure 1: Lyophilized Tubulin is >99% pure.

Coomassie G250-stained protein gel of Lyophilized Tubulin separated by SDS-PAGE. The tubulin appears as a single species migrating at ~55 kDa. Molecular weight markers and loaded protein quantities are indicated.

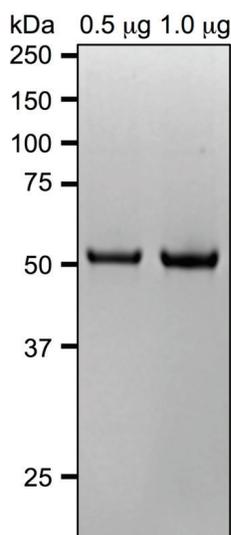
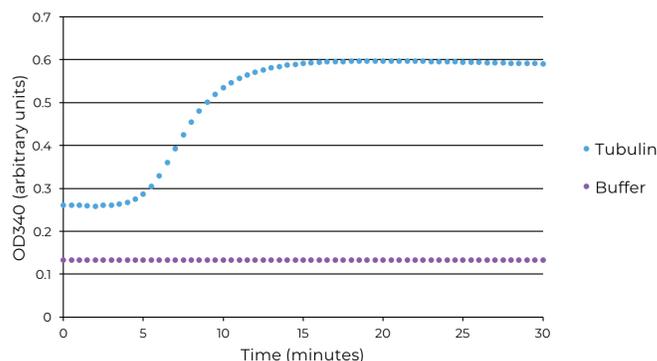


Figure 2: Lyophilized Tubulin is polymerization-competent.

Optical density (340 nm) of Lyophilized Tubulin at 5 mg/ml in 1X Tubulin PEM Buffer (Cat. No. 032003; 80 mM PIPES, 1 mM EGTA, and 1 mM MgCl₂, pH 6.8) supplemented with 1 mM GTP and 20% glycerol and incubated at 37°C. Distinct nucleation and polymerization phases are evident.



References

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