

## SHIGA TOXINS

Shiga toxins, also called verotoxins, inhibit protein synthesis in eukaryotic cells, and play a role in hemorrhagic colitis,<sup>1</sup> and hemolytic uremic syndrome.<sup>2,3</sup> These toxins damage endothelial cells in both kidney and brain, causing renal failure and neurological complications.<sup>4</sup>

The protein structure consists of two domains: the A polypeptide confers the activity, and the B polypeptide pentamer confers the receptor-specific binding. The A polypeptide has an N-glycosidase activity that cleaves an adenine from the 28S rRNA of the 60S cytoplasmic ribosome.<sup>5</sup> This activity renders the 28S rRNA unable to interact with the elongation factors EF-1 and EF-2, thus inhibiting protein synthesis. The B polypeptide forms a pentamer that binds to the eukaryotic cell receptor globotriaosylceramide (Gb<sub>3</sub>).<sup>6</sup> Shiga toxins then enter the cells by receptor-mediated endocytosis.<sup>7</sup>

The effects of Shiga toxin 1 and Shiga toxin 2 have been shown to vary with cell type because Gb<sub>3</sub> receptors are present in certain tissues, particularly sensory neurons and renal cells.<sup>8-10</sup> In those cell types, the receptor concentration and binding is modulated by factors such as tumor necrosis factor (TNF), interleukins,<sup>11,12</sup> and fatty acid content of the membranes.<sup>13-15</sup> Shiga toxin 1 and Shiga toxin 2 differ in their effects on various tissues.<sup>16,17</sup> However, they have both been shown to induce apoptosis in several different cell types.<sup>18-22</sup>

These toxins have many interesting effects at the cellular level. Once the Shiga toxins have been endocytosed, they are retrogradely transported through the Golgi apparatus to the rough endoplasmic reticulum where they effectively target the ribosomes.<sup>6,23</sup> In addition to inhibiting protein synthesis, Shiga toxins induce cytokines such as interleukin-1, interleukin-6, and interleukin-8.<sup>24-26</sup> They have also been shown to induce expression of tumor necrosis factor (TNF),<sup>27</sup> induce F-actin depolymerization,<sup>28</sup> and activate a Src kinase.<sup>29</sup>

Shiga toxin 1 and 2 from List Biological Laboratories, Inc., are recombinantly expressed in *E. coli* and are packaged as lyophilized proteins. Shiga toxins are very toxic and should be handled with extreme caution.<sup>30,31</sup> Mouse monoclonal and rabbit polyclonal antibodies to Shiga toxin 1 and 2 are available. An anti-Shiga toxin camelid antibody is also available. It is a heterotetramer VHH that recognizes both Shiga 1 and Shiga 2 toxins.

**These products are intended for research purposes only and are not for use in humans or as diagnostic agents. For further information, please contact List Biological Laboratories, Inc.**

### Ordering Information

Product No.	Description	Size
<b>161</b>	Shiga Toxin 1 from <i>E. coli</i> (lyophilized)	10 µg
<b>162</b>	Shiga Toxin 2 from <i>E. coli</i> (lyophilized)	10 µg
<b>761L</b>	Anti-Shiga Toxin 1, Rabbit IgG, Liquid	0.5 mg
<b>763</b>	Anti-Shiga Like Toxin 1 (Mouse IgG1-κ), Liquid	100 µg
<b>764</b>	Anti-Shiga Like Toxin 2 (Mouse IgG1-κ), Liquid	100 µg
<b>765L</b>	Anti-Shiga Toxin 2, Rabbit IgG, Liquid	0.5 mg
<b>766L</b>	Anti-Shiga Toxin, Camelid Antibody VHH	0.5 mg/ml

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