anatrace

Technical Bulletin 122

β-Chobimalt

β-Chobimalt is a novel, water-soluble cholesterol derivative produced and offered exclusively by Anatrace®. Specifically, β-Chobimalt is comprised of two maltosyl units via α 1→6 β linkage in conjunction with a β linkage directly to cholesterol. The resulting cholesterol analog has significant water solubility and can be classified as a non-ionic detergent.

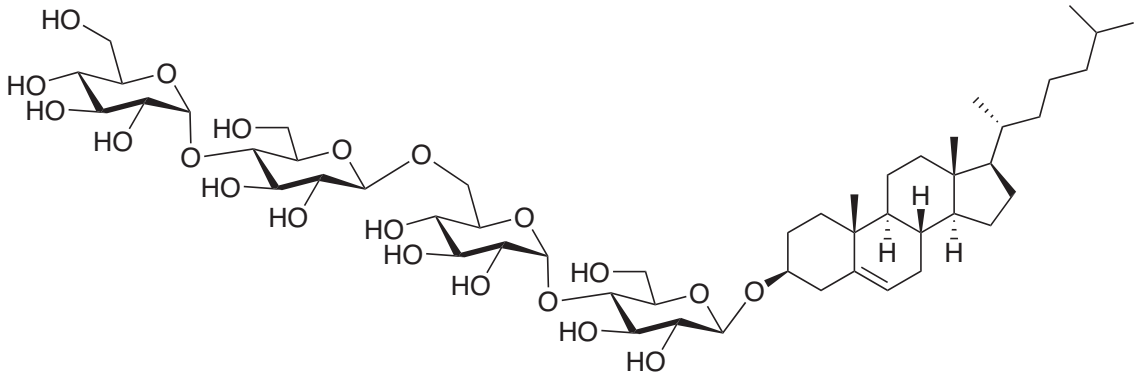

Figure 1. Chemical structure of β-Chobimalt (Cholesterol α-D-Glucopryanosyl-(1→4)-β-D-Glucopyranosyl-(1→6)-α-D-Glucopyranosyl-(1→4)-β -D-glucyopryanoside)

Benefits of using β-Chobimalt

Cholesterol is a key component of eukaryotic cell membranes and plays a critical role in membrane organization, fluidity and function[1,2]. In cholesterol-rich lipid raft (also called detergent-resistant membranes, DRM), numerous membrane proteins and important membrane activities, including those involved in signal transduction, are found[3].

In addition to the effect of cholesterol on membrane structure and function, the interaction of membrane proteins with cholesterol have been reported[4]. Many membrane proteins, such as G-protein coupled receptors (GPCRs)[3], cholesterol binding proteins (NPC1 and NPC2)[5], and amyloid precursor protein (APP)[4] require cholesterol binding to have their proper biological function.

Recently, the structural studies by NMR on APP indicate a new binding pocket of cholesterol in transmembrane c-terminal domain when β-Chobimalt was added in protein-detergent micelles[4]. Further studies revealed that APP may serve as a cholesterol sensor that is linked to mechanisms for suppressing cellular cholesterol uptake[4].

Although cholesterol analogs, *e.g.* cholesterol sulfate and hemisuccinate, were made commercially available in an effort to increase the effective solubility, laboratory tests indicate that these analogs are very difficult to dissolve alone in aqueous solution or even in a solution containing detergent micelles[4]. By contrast, β-Chobimalt is readily water-soluble, due to the innovative chemical design.

Our laboratory tests show that the aqueous solubility of β-Chobimalt is as much as 10%, superior to all current commercial cholesterol analogs.

β-Chobimalt is a water-soluble cholesterol derivative that mimics native cholesterol function in cell membrane systems[6]. This specificity will enable researchers to better understand the role of cholesterol in cell membranes and other membrane proteins.

Anatrace offers a high purity β-Chobimalt in three package sizes: 100 mg, 250 mg and 500 mg. In addition, Anatrace offers a wide range of high purity of synthetic lipids and detergents that have been highly reputed in the membrane protein research community.

CH220 **Chobimalt, Anagrade®**

[Cholestrol α-D-Glucopryanosyl-(1→4)-β-D-Glucopyranosyl-(1→6)-α-D-Glucopyranosyl-(1→4)-β-D-Glucyopryanoside]

Chemical Properties:

FW: 1035.2 $C_{51}H_{86}O_{21}$

CMC (H_2O): 0.004 mM[6]

Product Specifications:

Appearance: White powder

Purity: > 99.0% by HPLC analysis

Solubility in water: Up to 20%

Storage and Handling

Chobimalt should be stored at -20°C.

Stability: 1 year at room temperature.

References:

1. Simons, K. *et al.* (2000) *Science* **290**,1721-1726.
2. Mouritsen, O. G. *et. al.* (2004) *Lipids* **39**,1101-1113.
3. Thomas, J. *et. al.* (2006) *Progress in Lipid Research* **45**, 295-333.
4. Beel, A. J. *et. al.* (2008) *Biochemistry* **47**, 9428-9446.
5. Liu, J. P. *et. al.* (2009) *Molecular and Cellular Endocrinology* **303**, 1-6.
6. Howell, S., Mittal, R., Huang, L., Travis, B., Breyer, R. M. and Sanders, C. R. (2010) *Biochemistry* **49**, 9572-9583.

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