

PRODUCT DATA SHEET

Product Data Sheet

Revised: 03/10/03



Product name(s):	Bactenecin 5 precursor peptide [Bac5-GRR]				
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Catalogue number:	BW9315	Batch number:	Z0xxx	Expiry date:	10/2004
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Product information:

Bac5 is a 5-kDa proline- (>45%) and arginine- (>23%) rich antibiotic, stored as inactive precursor (*proBac5*) in the large granules of bovine neutrophils. A full-length cDNA encoding the precursor form of Bac5 has been cloned¹. The encoded protein (*pre-proBac5*) has a calculated mass of 20,031 Da and a pI of 9.21. This comprises a putative signal peptide of 29 amino acid residues and a 101-residue *pro*-sequence that precede the mature antibiotic. The *pro*-sequence is acidic and may neutralise the highly cationic Bac5, thus accounting for the inactivation of the antibiotic activity observed in *in vitro* experiments. The structure of mature Bac5 agrees closely with the amino acid sequence determined previously², with an additional tripeptide tail predicting carboxyl-terminal amidation. A valyl residue is deduced at the cleavage site for the proteolytic maturation of *proBac5*, consistent with the observation showing elastase as the enzyme involved in this processing step.

Bactenecin 5 shows a high degree of homology (25/46) with the proline-arginine-rich peptide antibiotic PR39 (**product code PW8850**)³. PR39 has been established as an inhibitor of the 20S and 26S proteasome⁴⁻⁵ although the mechanism for such inhibition is not yet fully elucidated⁶. In-house studies have established that bactenecin 5 also inhibits the chymotrypsin-like activity of the 20S proteasome (and probably the trypsin-like and caspase-like activities as well). Further studies are underway.

Structure:
H-RFRPPIRRPPIRPPFYPPFRPPIRPPIFPPIRPP FRPPLGPFPGRR-OH

Molecular formula:	46 amino acids
Molecular weight:	5517.8

Analytical and physico-chemical data:	
Amino acid analysis:	Results fully consistent with desired composition. Peptide content 65% w/w.
Purity:	Determined to be ≥95% by hplc.
Spectroscopic analysis:	Laser desorption mass spectrometry shows molecular ion at 5521.1 being consistent with the desired product.
Form:	White powder.
Solubility:	Soluble in aqueous solution.

Stability, storage and specific hazard data:

Store solid cold and dry at -20C; stable for at least one year. Store solutions at -20C for up to three months.

References:

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- Frank, R., Gennaro, R., Schneider, K., Przybylski, M. and Romeo, D. Amino acid sequences of two proline-rich bactenecins. *J. Biol. Chem.*, **265**, 18871-18874 (1990).
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- Gao, Y., Lecker, S., Post, M.J., Hietaranta, A.J., Li, J., Volk, R., Li, M., Sato, K., Saluja, A.K., Steer, M.L., Goldberg, A.L. and Simons, M. Inhibition of ubiquitin-proteasome pathway-mediated IκBα degradation by a naturally occurring antibacterial peptide. *J. Clin. Invest.*, **106**, 439-448 (2000).
- Gaczynska, M., Osmulski, P.A., Gao, Y., Post, M.J. and Simons, M. Proline- and arginine-rich peptides constitute a novel class of allosteric inhibitors of proteasome activity. *Biochemistry*, **42**, 8663-8670 (2003).