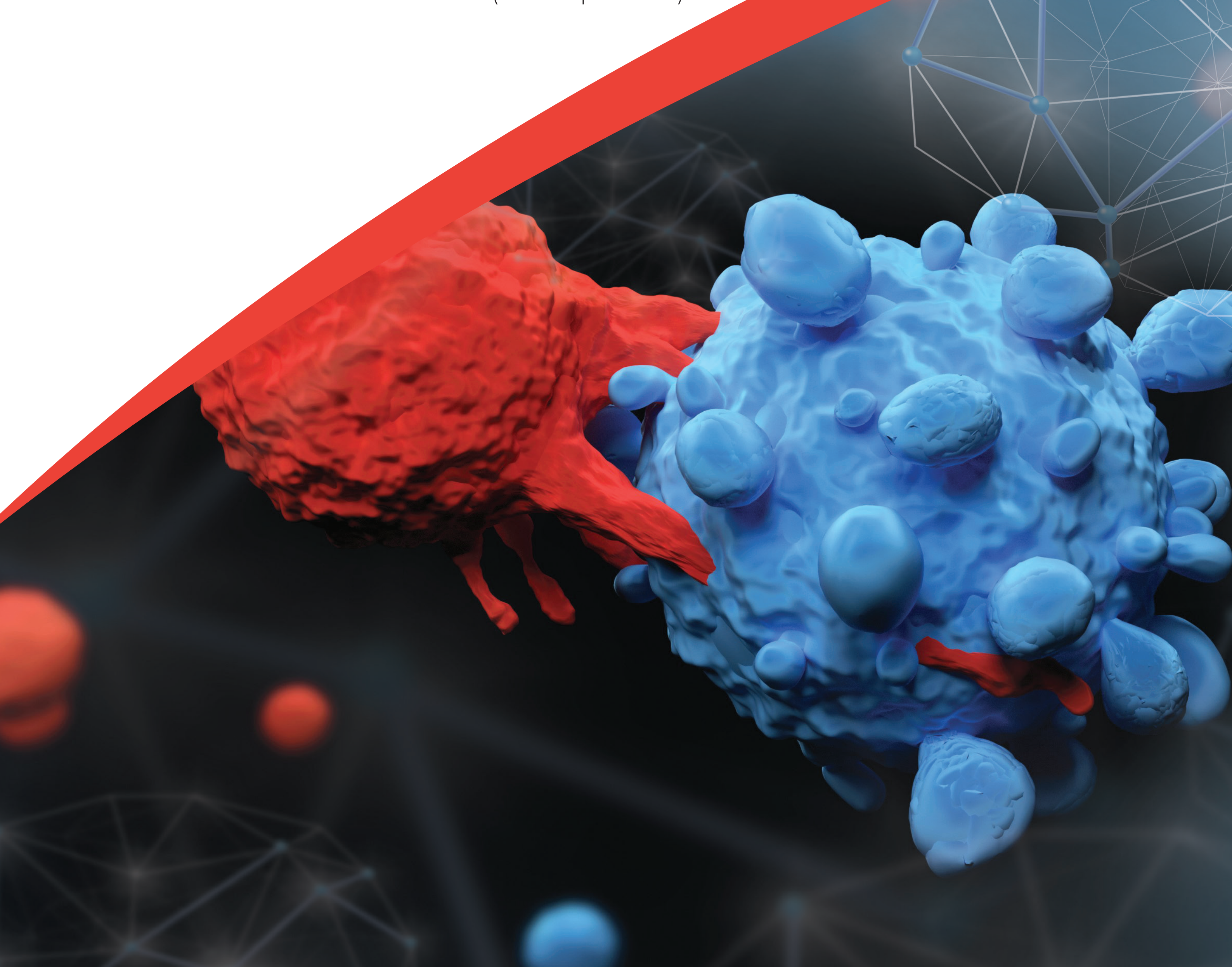
Partnering to Advance Human Health

Brochure

Think Almac...
Can we help you cure cancer?

Almac can help you achieve success in your cancer research programmes using our range of peptide technologies:

- Specialist research reagents
- Peptide conjugates
- Custom peptide synthesis
- Individualised cancer vaccines (NeoPeptides™)



Many peptides and classes of peptides are useful as tools in cancer research. Our custom synthesis group has been established for 30 years serving researchers around the world.

Specialist research reagents

Almac has honed its peptide manufacturing methodology to build a suite of specialist peptide-based reagents for use in cancer research.

Chemokines

Chemokines are a family of cytokines secreted by cells and are involved with immune response and cell migration. CXCR4 is one example of a chemokine receptor which is understood to have a role in cancer. The receptor ligand, CXCL12 (also known as SDF-1a) is chemotactic for CXCR4 expressing cells such as T lymphocytes and monocytes.

High levels of SDF1a are found in human tumour microenvironments and the SDF1a-CXCR4 interaction is known to promote metastasis[2]. In response to SDF1a, a variety of immune cells can migrate into the tumour and regulate the tumour immune response[3]. Understanding the role that SDF1a plays in cancer immunity is an exciting and rapidly expanding field.

SDF-1a is only one of over 30 human and mouse chemokines which are supplied by Almac in the wild-type form, as well as site-specifically labelled biotin and AF647(R) variants.

Histones

An octameric complex of histone proteins (H2A, H2B, H3 and H4) compacts and orders DNA into structural units called nucleosomes. Nucleosomes are further compacted into higher order structures called chromatin which further compress into chromosomes, which are stored within the cell nucleus.[1] Epigenetic post-translational modifications (PTMs) to the octameric histone complex influence the expression of genes and are required for cellular development and function.[2] However, studies have shown, disruption to the normal patterns of PTMs is also associated with the proliferation and propagation of various disease states including cancer.[3]

Epigenetics is a rapidly expanding field, with increasing emphasis on evaluating how its underlying mechanisms can be targeted to combat cancer. Indeed, several epigenetic treatments have been FDA approved, validating their potential as novel cancer therapeutics.[4]

Almac has experience synthesising full length histone sequences (H2A, H2B, H3 and H4) with the incorporation of amino acid modifications (acetylation, phosphorylation, methylation) to produce a range of bespoke post-translational modifications.

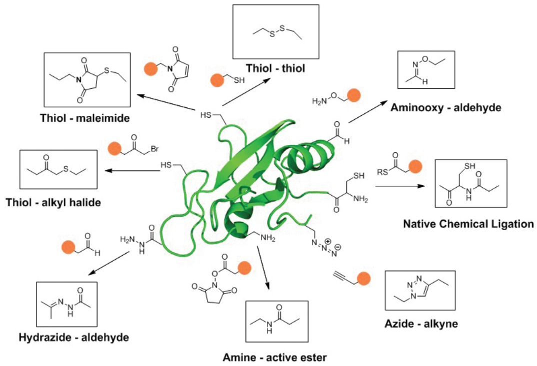
Ubiquitylated peptides

Ubiquitin is a 76 amino acid regulatory protein found in a wide variety of eukaryotic organisms. The post-translation ubiquitylation of proteins within the body regulates numerous cellular processes including protein degradation, endocytosis, DNA repair and gene transcription[1]. The tagging of mis-folded or aged proteins in the body with ubiquitin signals them for degradation by the proteasome. As cancer cells proliferate more rapidly than non-cancerous cells, their reliance on ubiquitin-mediated pathways of degradation makes such systems a valid target for therapeutic intervention[2].

Additionally, the enzymes involved in ubiquitylation and deubiquitylation (DUB's) have been identified as potential therapeutic targets for a range of disease conditions[3], [4]. Almac provides several reagents to incorporate ubiquitin site-specifically onto a peptide and custom ubiquitylated peptides linked via a native isopeptide bond for assays, drug screening and profiling applications.

Peptide conjugates

Conjugation is a common technique to enhance physiological properties, such as in the generation of Antibody Drug Conjugates. Almac has experience in designing robust processes for the manufacture of peptide-derived payloads1 that are suitably functionalised to effect conjugation. We also have developed significant experience in a wide range of conjugation methodology, enabling the site-specific conjugation of peptides to moieties, such as other peptides, small molecules and proteins.



Almac has significant experience in dealing with the unique challenges presented by the manufacture of a multi-component peptide vaccine, including the manufacture of the individual peptides, determining the properties of each component peptide to inform formulation activities and full analytical support tailored towards analysing multi-component peptide mixtures.

Therapeutic cancer vaccines

Tumour associated antigen cancer vaccines

Many cancer cells display tumour associated antigens (TAAs)1 derived from genetic coding that is normally silenced, but are reactivated in tumour cells, or are proteins which are highly elevated in tumour cells, relative to normal cells. In order to give a prospective vaccine the best chance of success, often several epitopes to the TAA are included. The vaccine product is consequently a mix of multiple peptide epitopes, each of which has to be manufactured individually.

We have supported numerous projects of this type, and have significant experience of the manufacturing development and analytical support studies required to fulfil a successful campaign.

Individualised cancer vaccines (NeoPeptides™)

The latest trend in oncology is to administer treatment on an entirely individualized basis.

In these circumstances, Next Generation Sequencing (NGS) is use to genetically map tumour and normal cells and identify mutations. These mutations are assessed using a range of techniques for those that are likely to generate good epitopes (neoantigens) and hence viable vaccine candidates. Multiple neoantigen-derived peptides (NeoPeptides™), often 20 or more, are selected for manufacture. These must be manufactured to GMP in only a few weeks in order to minimise the needle to needle time from tumour biopsy to vaccination.

Almac has built the NeoPeptides™ offering over the last three years, supplying peptides for pilot studies and clinical trials. This unique offering has been achieved through construction of a purpose-build GMP facility and Pharmaceutical Quality System designed solely for the purpose of peptide manufacture for individualised cancer vaccines.

TECHNICAL CAPABILITY

- Rapid manufacture of standard peptides
- Long peptides, even over 200 amino acids
- Cyclic peptides (macrocyclic, stapled peptides, bicyclic peptides)
- Folded proteins (multiple disulfide bridges)

CUSTOMER CARE

- Direct point of contact to technical experts
- Rapid response to your technical enquiries
- Consultation on peptide manufacturing methods

www.shop.almacgroup.com

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Chemokines

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Tumour associated antigen cancer vaccines

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almacgroup.com

Get in touch

Global HQ
+44 28 3836 2436

Edinburgh, UK
+44 28 3839 5717

US HQ
+1 215 660 8500

peptides@almacgroup.com