

A photograph of a male scientist with glasses, wearing a white lab coat and purple gloves, working in a laboratory. He is holding a test tube and looking at it intently. In the background, there is laboratory equipment like a metal stand and other test tubes. A blue wavy graphic element is at the bottom of the image.

# The International Blood Group Reference Laboratory (IBGRL)

IBGRL is part of NHS Blood and Transplant (NHSBT) and is based at the Filton Blood Centre, Bristol UK. IBGRL includes three different functions; Molecular Diagnostics, Red Cell Reference and the Protein Development and Production Unit (PDPU). The first two departments provide a tertiary reference service while PDPU develops and provides proteins for research and diagnostic use.

## Protein Development and Production Unit (PDPU)

### History

Since 1946, IBGRL has been involved in providing blood grouping reagents for use in transfusion science. In 1982, a monoclonal antibody development group, PDPU, was set up to produce monoclonal antibody blood grouping reagents which are still in use across the globe. Many antibodies were generated to other red cell antigens. Some of these were evaluated at international workshops, resulting in a program to develop them for research use. Since April 1991, these reagents have been supplied as IBGRL Research Products, both internally within NHSBT and externally to hospitals, academic institutes and commercial customers worldwide.

The PDPU portfolio has expanded over the last 2 decades and now includes a range of projects to develop and deliver recombinant proteins, monoclonal antibodies and diagnostic cell lines for research and diagnostic use.

## **Services offered by PDPU**

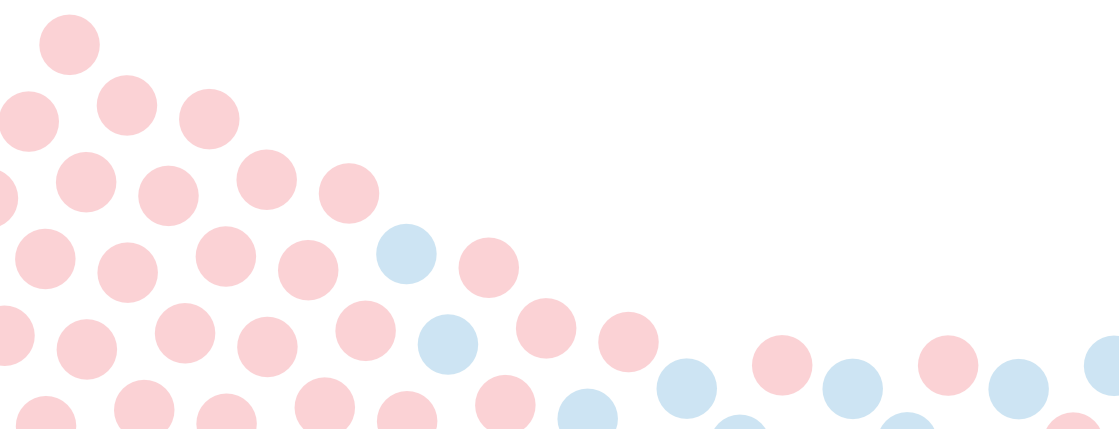
### **Cell Culture, development of cell lines and purification services**

1. Hybridoma and recombinant cell line generation, optimisation and stability studies.
2. Development of existing customer cell lines including mycoplasma testing, optimisation and stability studies.
3. Custom production of antibody and antigens from cell lines.
4. Protein purification and QC validation to customer specification including employing low endotoxin conditions.
5. Antibody fragmentation and purification.
6. CE marking of derived reagents.
7. Provision of IBGRL cell lines under a license agreement.

### **Antibody and Antigen engineering services**

PDPU provide antibody and antigen engineering services using molecular techniques.

1. Modification of existing antibodies e.g. class switching.
2. Isolation of new antibody specificities.
3. Rescue of unstable cell lines.
4. Recombinant protein attachment to Luminex beads for detection of patient antibodies
5. Recombinant proteins for inhibition of 'nuisance' or therapeutic antibodies that interfere with blood group serology.
6. Recombinant protein expression on the surface of heterologous cells for use as diagnostic cell lines, avoiding the need for freshly isolated typed donor cells.



## Technology Assessment Centre

As well as bringing its own portfolio of reagents to market, PDPU can provide a service to external companies with the validation of new technologies in the field of transfusion-related patient care. The Technology Assessment Centre, which is part of PDPU, is perfectly placed to provide everything needed to rigorously test new equipment or assays, to ensure they have the required sensitivity and specificity. For further information, please enquire.



The IBGRL Research Product catalogue contains over 100 monoclonal antibodies and recombinant proteins which are manufactured and tested by PDPU. Most products are supplied for Research Use Only, but we also produce several CE marked reagents for diagnostic use.

IBGRL Research Products are available as cell culture supernatant, purified antibody and FITC, phycoerythrin, APC and biotin conjugated antibodies. Other conjugates e.g. iFluor™ (alternative to Alexa Fluor®) or HRP are available on request.

Products of interest to haematology/transfusion labs using flow cytometry include:

- 1. CE marked FMH antibodies:** Three CE Marked antibodies used for determination of the volume of feto-maternal haemorrhage (FMH) by flow cytometry. These antibodies are BRAD 3 FITC (anti-D), AEVZ 5.3 FITC (isotype matched negative control) and BIRMA 17C PE (anti-CD66b), which is used in combination with BRAD 3 and the negative control, as a two colour assay to reduce interference from neutrophils (by gating).
- 2. Recombinant proteins:** Other products being CE marked include several soluble recombinant proteins (srp). Sometimes the detection and identification of clinically significant blood group specific antibodies in patients requiring blood transfusion can be difficult if antibodies to high frequency antigens are also present. In these cases, srp with blood group antigen activity can be used to inhibit haemagglutination by these 'nuisance' antibodies, allowing identification of underlying clinically significant antibodies e.g. Knops Inhibition Reagent (KNIR) for inhibition of CR1-specific antibodies, and srCD38 for inhibition of therapeutic anti-CD38 monoclonal antibodies.

3. **FITC IgG anti-CD59** is useful for investigation of Paroxysmal nocturnal hemoglobinuria.
4. **Other antibody specificities** include antibodies to proteins found on the outside and inside of many cell types, for example red blood cells, platelets, and white blood cells. These include anti-A, B, RhD, RhE, H, M, N, and CD markers listed below, Glycophorins A and C, Band 3 Wr<sup>b</sup>, Tn, Kell, Kp<sup>bc</sup>, Lu and Lu<sup>b</sup>, Le<sup>a</sup>, platelet CD41/61, CD49b/29, granulocyte CD66b, HLA, NK cells and the cytoskeletal proteins spectrin, ankyrin and Protein 4.2.
5. PDPUs also supply antibodies to complement proteins, and secondary reagents for serology and flow cytometry.

### Product categories: Human Clusters of Differentiation (CD) molecules

CD	Synonym
CD34	Haematopoietic progenitor cell, MY10
CD41	GPIIb platelet component of integrin GPIIb-IIIa
CD41/CD61	Platelet GpIIb/IIIa
CD42b	Platelet GPIb
CD44	H-CAM, Pgp-1, Hermes
CD45RA	T200, gp220
CD47	IAP
CD49b/29	VLA-2, Platelet GPIa/IIa
CD50	ICAM-3
CD55	DAF
CD58	LFA-3
CD59	HRF20, MIRL, P18, H19, Membrane Attack Complex-inhibitor
CD66b	CD67
CD173	H
CD174	Lewis Y
CD175	Tn

CD233	Erythrocyte band 3, EPB3, anion exchange protein 1, AE1
CD235a	Glycophorin A, MN blood group Ag
CD233/235a	Wrb
CD236R	Glycophorin C
CD238	Kell
CD239	Lutheran, B-cell adhesion molecule (B-CAM)
CD240	Rh
CD240CE	RhCE
CD240D	RhD

### Cell lines available for commercial licensing:

#### Diagnostic:

Major IgM Blood Grouping	A, B and D
Minor Blood Grouping	A/A1, B, N, D, E, Le, Le <sup>a</sup> , Lu, Lu <sup>b</sup> , Wr <sup>b</sup>
Other	C3c, C3d, IgG, IgG control, IgM control

#### Research:

Erythrocytes	A, B RhD, CD173, 175, 233, 235a, 236R, 238, 239, 240
Cytoskeletal	Spectrin, Ankyrin, Protein 4.2, Glut-1
Platelet and granulocytes	CD29, 41, 42b, 49b, 61, 66b
Many cells/tissues	CD44, 47, 55, 58, 59, 239
HLA/stem cells/Leucocytes/ other	Class I A and B, CD34, 45RA, 50, NK, GM-CSF, ENA



**Please contact PDPU for data sheets,  
prices and further information**

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