



Immunosuppressant reference materials

Immunosuppressant agents are used to inhibit or reduce the activity of the immune system. They are prescribed to prevent rejection of organs and tissues following transplantation. They are also used for many non-transplant indications, including autoimmune and other inflammatory diseases, such as psoriasis, atopic dermatitis, rheumatoid arthritis, nephritic syndrome and ulcerative colitis.

From a therapeutic drug monitoring (TDM) perspective, immunosuppressant drugs can

broadly be divided into three main types; 1) Calcineurin inhibitors (CNI) (Cyclosporin and Tacrolimus), 2) Mammalian target of rapamycin inhibitors (mTOR) (Sirolimus and Everolimus) and 3) Inosine monophosphate dehydrogenase (IMPDH) inhibitors (Mycophenolic acid). The differing mechanisms of action of these drug groups mean that they can be effectively combined, lowering the doses required, which reduces the risk of toxicity whilst still maintaining sufficient immunosuppression.

LGC has brought together the full range of clinically relevant parent drugs and metabolites together with their internal standards, matrix materials and proficiency testing schemes.



Reference materials

| Product code | Description | Unit 1 | Unit 2 |
|---|---|--------|--------|
| Calcineurin inhibitors (CNI) | | | |
| Cyclosporin (Ciclosporin) | | | |
| TRC-C988900 | Cyclosporin A | 1 g | 10 g |
| CERC-093 | Cyclosporin A, 1.0 mg/ml | 1 ml | |
| CERC-104 | Cyclosporin A, 100 µg/ml | 1 ml | |
| TRC-C988902 | Cyclosporin A-d4 | 1 mg | 10 mg |
| TRC-C988890 | Cyclosporin A Acetate | 100 mg | 1 mg |
| TRC-C988892 | Cyclosporin A-d4 Acetate | 1 mg | 10 mg |
| TRC-C988895 | Cyclosporin A Sulfate | 10 mg | |
| TRC-C988910 | Cyclosporin D | 1 mg | 10 mg |
| CERC-108 | Cyclosporin D, 1.0 mg/ml | 1 ml | |
| TRC-C988912 | Cyclosporin D-d4 | 0.5 mg | 5 mg |
| | | | |
| Tacrolimus (FK506) | | | |
| TRC-F370000 | Tacrolimus | 5 mg | 50 mg |
| CERT-049 | Tacrolimus, 1.0 mg/ml | 1 ml | |
| TRC-F370002 | Tacrolimus-13C, d2 (Major) | 2.5 mg | 25 mg |
| | | | |
| Mammalian target of rapamycin inhibitors (mTOR) | | | |
| Sirolimus (Rapamycin) | | | |
| TRC-R124000 | Sirolimus | 5 mg | 50 mg |
| CERS-015 | Sirolimus, 1.0 mg/ml | 1 ml | |
| TRC-D231240 | 7-O-Demethyl sirolimus | 1 mg | 10 mg |
| | | | |
| Everolimus (SDZ-RAD) | | | |
| TRC-E945400 | Everolimus | 5 mg | 50 mg |
| TRC-E945402 | Everolimus-d4 | 1 mg | 10 mg |
| CERE-070 | Everolimus-d4, 100 µg/ml | 1 ml | |
| | | | |
| Inosine monophosphate dehydrogenase inhibitors (IMPDH) | | | |
| Mycophenolic acid (MPA) | | | |
| LGCFOR1001.00 | Mycophenolate mofetil (MMF) | 10 mg | |
| CER-B130335-25 | Mycophenolate mofetil-d4 | 5 mg | |
| LGCFOR1001.06 | Mycophenolic acid (MPA) | 10 mg | |
| LGCAMP1001.06-11 | Mycophenolic acid, 1.0 mg/ml | 1 ml | |
| TRC-M831502 | Mycophenolic acid-d3 | 1 mg | 10 mg |
| CERM-137 | Mycophenolic acid-d3, 100 µg/ml | 1 ml | |
| TRC-M831520 | Mycophenolic acid β-D-glucuronide (MPAG) | 2.5 mg | 25 mg |
| CERM-135 | Mycophenolic acid-β-D-glucuronide, 1.0 mg/ml | 1 ml | |
| TRC-M831522 | Mycophenolic acid-d3 β-D-glucuronide | 1 mg | 10 mg |
| TRC-M831525 | Mycophenolic acid acyl-β-D-glucuronide (AcMPAG) | 1 mg | 10 mg |
| TRC-M831527 | Mycophenolic acid-d3 acyl-β-D-glucuronide | 1 mg | 10 mg |

| Product code | Description | Unit 1 | Unit 2 |
|------------------------------------|--|-------------|--------|
| Others | | | |
| CERA-094 | Ascomycin, 1.0 mg/mL | 1 ml | |
| Internal Standard Solutions | | | |
| REC-MS1012 | Internal Standard, lyophil, for Immunosuppressants (2 µg Ascomycin) | 2.5 ml | |
| REC-MS1112 | Internal Standard, lyophil, for Immunosuppressants (25 µg Cyclosporin D) | 5 ml | |
| REC-MS1212 | Internal Standard, lyophil, for Immunosuppressants (0.6 µg Ascomycin, 3.75 µg Cyclosporin D, 0.1 µg Everolimus-d4) | 3 ml | |
| REC-MS1312 | Internal Standard, lyophil, for Immunosuppressants (6.25 µg Cyclosporin A-d12, 0.5 µg Tacrolimus-13C, d2, 0.5 µg Sirolimus-13C, d3, 0.5 µg Everolimus-13C2,d4) | As required | |

High order reference materials

| Product code | Description | Pack size |
|-------------------|-------------------------------------|-----------|
| Tacrolimus | | |
| ERM© DA110 | Tacrolimus, Human Blood, 7.41 mg/kg | 1 ml |

Matrix materials

| Product code | Product | Pack size |
|--|---|--------------|
| ClinCal® calibrators, lyophilised, for Immunosuppressants | | |
| Cyclosporine A, Tacrolimus, Sirolimus, Everolimus | | |
| REC-5013 | Whole Blood Immunosuppressant Calibrator (Single point) | 5 x 2 ml |
| REC-9033 | Whole Blood Immunosuppressant Calibrator (Level 0-3) | 4 x 1 x 2 ml |
| REC-9933 | Whole Blood Immunosuppressant Calibrator (Level 0-6) | 7 x 1 x 2 ml |
| Mycophenolic Acid | | |
| REC-29013 | Plasma Mycophenolic Acid Calibrator (Single point) | 1 x 3 ml |
| REC-9904 | Plasma Mycophenolic Acid Calibrator (Level 0-3) | 4 x 1 x 1 ml |

| ClinChek® controls, lyophilised, for Immunosuppressants | | |
|--|--|--------------|
| Cyclosporine A, Tacrolimus, Sirolimus, Everolimus | | |
| REC-8830 | Whole Blood Immunosuppressant Control Level I | 5 x 2 ml |
| REC-8831 | Whole Blood Immunosuppressant Control Level II | 5 x 2 ml |
| REC-8832 | Whole Blood Immunosuppressant Control Level III | 5 x 2 ml |
| REC-8833 | Whole Blood Immunosuppressant Control (Tri-level) | 3 x 2 x 2 ml |
| Cyclosporine A | | |
| REC-8903 | Whole Blood Immunosuppressant Control Level IV, V | 2 x 2 x 2 ml |
| Mycophenolic Acid | | |
| REC-29080 | Plasma Mycophenolic Acid Control Level I | 10 x 3 ml |
| REC-29081 | Plasma Mycophenolic Acid Control Level II | 10 x 3 ml |
| REC-29082 | Plasma Mycophenolic Acid Control Level III | 10 x 3 ml |
| REC-29083 | Plasma Mycophenolic Acid Control Level (Tri-level) | 3 x 3 x 3 ml |

Proficiency testing scheme

| Analyte | Matrix | Distribution frequency | Samples* |
|--|--------|------------------------|----------|
| ASI Ltd. Immunosuppressive Scheme: Annual program offered by LGC Standards <i>Spiked and authentic patient pooled samples</i> | | | |
| Cyclosporine A (Ciclosporin) | Blood | Monthly | 3 x 1 ml |
| Tacrolimus (FK506) | Blood | Monthly | 3 x 1 ml |
| Sirolimus (Rapamycin) | Blood | Monthly | 3 x 1 ml |
| Everolimus (SDZRAD) | Blood | Bi-monthly | 3 x 1 ml |
| Mycophenolic Acid (MPA) | Plasma | Quartly | 2 x 1 ml |

**Other sample volumes available upon request.*

Contact us for information on our solvents and additives for clinical and forensics applications.

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