Clinical Chemistry ESLIM_015_001

Purpose

For the determination of biochemical parameters in plasma including enzymatic activities, specific substrates and electrolytes using an Olympus AU400 analyser (Olympus Diagnostics).

EMPReSS	Title: Clinical chemistry (non-fasted) – pipeline 2	
Standard Operating Procedure	Doc. Number: ESLIM_015_001	Date Issued: 02/06/09

1. Purpose:

For the determination of biochemical parameters in plasma including enzymatic activities, specific substrates and electrolytes using an Olympus AU400 analyser (Olympus Diagnostics).

2. Associated Documents:

ESLIM_024_001: Blood collection by retro-orbital puncture

ESLIM_025_001: Blood collection by tail venipuncture

ESLIM_026_001: Blood sample handling Clinical chemistry

ESLIM_015_001_Annex_1: Clinical chemistry reagents

ESLIM_015_001_Annex_2: Clinical chemistry calibrators

ESLIM_015_001_Annex_3: Clinical chemistry controls

Olympus AU400 analyser operator manual

ESLIM_027_001: Blood sample handling Haematology

3. Notes

3.1. The validity of results obtained from metabolic studies is largely dependent on methods of animal husbandry. It is of vital importance that individuals following this procedure are experienced and aware of the animal's welfare, and are familiar with the animal being tested, in order to reduce the anxiety levels of the animal prior to testing.

3.2. The majority of mouse metabolic studies are age/sex/strain dependent. It is important to keep these parameters comparable throughout a single experiment.

3.3. It is recommended that all metabolic experimentation is conducted at approximately the same time of day because physiological and biochemical parameters change throughout the day.

3.4. All samples should be considered as potentially hazardous.

4. Quality Control:

4.1. Each morning, all parameters are tested with control sera (see ESLIM_015_001_Annex_3: Controls for biochemistry on AU400). Some parameters are tested with control serum level 1 (Olympus System Reagent, ODC0003) and control serum level 2 (Olympus System Reagent, ODC0004), which consists of lyophilised human plasma with a normal and a pathological concentration. Other parameters are tested with specific controls from other suppliers.

4.2. Controls are thawed and vortexed before utilisation and loaded according to the analyser's display. Control values must lie within the acceptable range indicated by the manufacturer, otherwise the specific tests must be recalibrated and specific measurements repeated. Controls can be stored in 200µl aliquots at -20°C for up to 1 week.

5. Equipment:

5.1. Olympus AU400 analyser (Olympus Diagnostics)

5.2. Vortex

5.3. Refrigerated centrifuge

5.4. Eppendorf tubes

5.5. Pipettes (200-1000µl)

6. Supplies:

6.1. Deionised water

6.2. Reagents:

All reagents for Olympus AU400 from Olympus Diagnostics and other suppliers (see ESLIM_015_001_Annex_1: Clinical chemistry reagents)

6.3. Calibrators:

All calibrators for Olympus AU400 from Olympus Diagnostics and other suppliers (see ESLIM_015_001_Annex_2: Clinical chemistry calibrators)

6.4. Quality Control:

All quality controls for Olympus AU400 from Olympus Diagnostics and other suppliers (see ESLIM_015_001_Annex_3: Clinical chemistry controls)

7. Procedure:

Summary of protocol:

- **Record mouse weight**
- **Collection and storage**
- **Calibration**
- **Sample preparation**
- **Analysing results**

7.1. For analyser operation, refer to the Olympus AU400 analyser manual.

7.2. **Record mouse weight**

7.3. **Collection and storage**:

7.3.1. Collect blood samples according to the blood sample collection and handling SOPs
(see
ESLIM_024_001 Blood collection retro-orbital puncture,
ESLIM_025_001 Blood collection tail venipuncture,
ESLIM_026_001 Blood sample handling clinical chemistry).

7.3.2. Keep whole blood samples at room temperature until centrifugation. If plasma samples cannot be analysed immediately, keep them in the fridge until analysis (allowing them to reach room temperature prior to analysis).

7.3.3. Stability during storage varies between plasma parameters (see ESLIM_015_001_Annex_1: Clinical chemistry reagents). If analyses are not performed on the day of collection, store plasma samples at minus 20°C.

7.3.4. Volume required: 160-200µl plasma.

7.3.5. Exclusion criteria: severe haemolysis.

7.4. **Calibration**:

7.4.1. Frequency of calibration varies between tests and depends on the workflow, (see operator manual and ESLIM_015_001_Annex_2: Clinical chemistry calibrators).

7.4.2. Calibration is required when an existing calibration expires, when reagents

are replaced and when control results fall outside specified acceptable ranges.

7.4.3. Most of the parameters are calibrated using the Olympus system calibrator. Parameters that cannot be calibrated with the Olympus system calibrator need additional calibration material – see ESLIM_015_001_Annex_2: Clinical chemistry calibrators

7.5. **Sample preparation:**

7.5.1. Prepare the plasma samples collected on the same day of the measurement (see section 4) or thaw frozen samples.

7.5.2. Use plasma samples undiluted or diluted to a ratio of 1:2 with deionised water if the volume is insufficient.

7.5.3. Vortex all plasma samples and briefly centrifuge them at ~5000 x g for 2 - 3 minutes.

7.5.4. If necessary, remove fibrinogen clots using a wooden applicator.

7.5.5. Load the racks according to the work lists.

7.6. **Analysing results**:

7.6.1. Samples that produce results that lie outside the linear range for a specific assay have to be re-tested. In some cases it may be necessary to dilute samples with water to bring test results into range.

7.6.2. Validate the data.

7.6.3. Transfer the data to the database

8. Parameters recorded

The following parameters are required:

- Glucose
- Urea
- Creatinine
- Sodium
- Potassium
- Chloride
- Total protein
- Albumin
- Calcium
- Phosphorus
- Iron
- Lactate dehydrogenase
- Aspartate aminotransferase
- Alanine aminotransferase
- Alkaline phosphatase
- Alpha-amylase
- Total cholesterol
- Triglyceride

The following parameters are optional:

- Creatine kinase
- Uric acid
- Total bilirubin
- HDL-cholesterol
- LDL-cholesterol
- Ferretin
- Transferrin

- C-Reactive protein

9. Metadata recorded

The following metadata is required:

- Equipment name (e.g. Clinical chemistry analyzer)
- Equipment manufacturer (e.g. Olympus Diagnostics)
- Equipment model (e.g. AU400)
- Method of blood collection (e.g. retro-orbital)
- Date/Time of blood collection
- Fasting prior to experiment should be no
- Plasma dilution (e.g. neat)
- Sample Status (e.g. fresh)
- Anaesthesia used for blood collection (e.g. isofluorane)

The following metadata is optional:

- Period of fasting**
- Moved from cage for fasting
- EMPReSSID for blood collection SOP
- Day of measurement

** fasting will be entered as an approximate period, e.g. 14 hours

10. Supporting information

There is no supporting information available for this SOP.

11. History Review

There is no History Review available for this SOP

Parameters and Metadata

Glucose ESLIM_015_001_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: mmol/l

Description: Glucose

Urea ESLIM_015_001_002 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: mmol/l

Description: Urea

Creatinine ESLIM_015_001_003 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: umol/l

Description: Creatinine

Sodium ESLIM_015_001_004 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: mmol/l

Description: Sodium

Potassium ESLIM_015_001_005 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: mmol/l

Description: Potassium

Chloride ESLIM_015_001_006 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: mmol/l

Description: Chloride

Total protein ESLIM_015_001_007 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: g/l

Description: Total_protein

Albumin ESLIM_015_001_008 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: g/l

Description: Albumin

Calcium ESLIM_015_001_009 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: mmol/l

Description: Calcium

Phosphorus ESLIM_015_001_010 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: mmol/l

Description: Phosphorus

Iron ESLIM_015_001_011 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: umol/l

Description: Iron

Lactate dehydrogenase ESLIM_015_001_012 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: U/l

Description: Lactate_dehydrogenase

Aspartate aminotransferase ESLIM_015_001_013 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: U/l

Description: Aspartate_aminotransferase

Alanine aminotransferase ESLIM_015_001_014 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: U/l

Description: Alanine_aminotransferase

Alkaline phosphatase ESLIM_015_001_015 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: U/l

Description: Alkaline_phosphatase

Alpha-amylase ESLIM_015_001_016 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: U/l

Description: Alphaamylase

Total cholesterol ESLIM_015_001_017 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: mmol/l

Description: Total_cholesterol

Triglyceride ESLIM_015_001_018 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Unit Measured: mmol/l

Description: Triglyceride

Free fatty acid ESLIM_015_001_019 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: mmol/l

Description: Free_fatty_acid

Creatine kinase ESLIM_015_001_020 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: U/l

Description: Creatine_kinase

Uric acid ESLIM_015_001_021 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: umol/l

Description: Uric_acid

Total bilirubin ESLIM_015_001_022 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: umol/l

Description: Total_bilirubin

HDL-cholesterol ESLIM_015_001_023 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: mmol/l

Description: HDLcholesterol

LDL-cholesterol ESLIM_015_001_024 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: mmol/l

Description: LDLcholesterol

Ferretin ESLIM_015_001_025 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: mg/ml

Description: Ferretin

Transferrin ESLIM_015_001_026 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: mg/dl

Description: Transferrin

C-reactive protein ESLIM_015_001_027 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: mg/l

Description: CReactive_protein

Equipment name ESLIM_015_001_801 | v1.0

procedureMetadata

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Description: Equipment_name

Equipment manufacturer ESLIM_015_001_802 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** true **Is Annotated:** false

Description: Equipment_manufacturer

Equipment model ESLIM_015_001_803 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** true **Is Annotated:** false

Description: Equipment_model

Method of blood collection ESLIM_015_001_804 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** true **Is Annotated:** false

Description: Method_of_blood_collection

EMPReSSID for blood collection SOP ESLIM_015_001_805 | v1.0

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Description: EMPReSSID_for_blood_collection_SOP

Date/time of blood collection ESLIM_015_001_806 | v1.0

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Description: DateTime_of_blood_collection

Fasting prior to experiment ESLIM_015_001_807 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** true **Is Annotated:** false

Description: Fasting_prior_to_experiment

Options: yes, no,

Approximate period of fasting ESLIM_015_001_808 | v1.0

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Unit Measured: Hours

Description: Approximate_period_of_fasting

Moved from cage for fasting ESLIM_015_001_809 | v1.0

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Description: Moved_from_cage_for_fasting

Options: yes, no,

Plasma dilution ESLIM_015_001_810 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** true **Is Annotated:** false

Description: Plasma_dilution

Sample status ESLIM_015_001_811 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** true **Is Annotated:** false

Description: Sample_status

Options: fresh, frozen,

Anaesthesia used for blood collection ESLIM_015_001_812 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** true **Is Annotated:** false

Description: Anaesthesia_used_for_blood_collection

Date of measurement ESLIM_015_001_813 | v1.0

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Description: Date_of_measurement

Haemolysis status ESLIM_015_001_814 | v1.0

procedureMetadata

Req. Analysis: true **Req. Upload:** true **Is Annotated:** false

Description: Haemolysis_Status

Options: N, /, NP, +, ++, +++, ++++, +++++, ABN,