

SRI VENKATESWARA INSTITUTE OF MEDICAL SCIENCES
(A University established by an act of A.P. State legislature)
TIRUMALA TIRUPATI DEVASTHANAMS, TIRUPATI - 517501

CLINICIAN'S REFERENCE MANUAL



DEPARTMENT OF BIOCHEMISTRY

What is this manual about?

This manual is designed to provide an overview of the services offered by the **Department of Biochemistry** and serve as a quick reference guide for all users.

Laboratory Management is committed to ensure stringent adherence to quality in all laboratory procedures that meet requirements of internal and external quality assessment tests and in accordance with requirements of the ISO15189

Document Control

Electronic version of this manual is available on SVIMS website

Location

The department of Biochemistry is located on the 2nd floor of SVIMS O.P Block.

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1. Getting Started

LOCATION OF THE DEPARTMENT

The department of Biochemistry is located on the 2nd floor of Sri Padmavathi OPD Block, SVIMS.

DEPARTMENTAL WORKING HOURS

Department/activity	Opening Hours
Biochemistry Reception	Round the clock
Phlebotomy Out-patient Service	Monday to Saturday OP Collection centre: 7.00 am – 3:00 pm SVIMS Clinic & SPMCW hospital: 7am-1.00 pm
Phlebotomy In-patient Service	Round the clock
Sample Reception	
Clinical Biochemistry	Round the clock
STAT lab parameters and Emergency services	Round the clock
Routine Laboratory Diagnostic Service	Monday to Saturday 8.00am - 4.pm

DEPARTMENT FACULTY & CONTACT NUMBERS

Section	Phone extension Inside the Hospital	Phoning from outside the hospital
Office	2233	0877-2287777 ext. 2233
HOD Biochemistry	2427	0877-2287777 ext.2427
Faculty	2239	0877-2287777 ext.2239
Clinical-lab Reception	2232	0877-2287777 ext.2232

2. SERVICES OFFERED / LABORATORY TESTS OR PROFILES AVAILABLE

S.NO	PANEL	INVESTIGATIONS
1	Glucose – fasting, post prandial, post glucose, random, GTT	Glucose
2	Renal function tests	Urea, Creatinine, uric acid,
3	Electrolytes	Sodium, Potassium, Chloride
4	Enzymes	LDH, Amylase, ADA, CPK, CPK-MB, Cholinesterase
5	Liver function tests	Bilirubin – Total and conjugated, total protein, albumin, SGOT,SGPT, ALP
6	Lipid profile	Cholesterol, Triglycerides, HDL, LDL, VLDL
7	CHD risk	Lp(a), Homocysteine, Fibrinogen, hsCRP
8	Acid base status	ABG, Osmolality, Bicarbonate
9	Anemia markers & Minerals	Iron, Ferritin, UIBC, Magnesium, calcium, phosphorus
10	Therapeutic drug monitoring	Phenytoin, Phenobarbitone, Carbamazepine
11	Tumor markers	AFP, CA-125, CEA, HCG, PSA, Free PSA
12	Covid panel	D-Dimer, Interleukin-6
13	Urine – special investigations	Metanephrine and normetanephrines, microalbumin, Bence Jones proteins
14	New investigations	Lactate, Lipase

3. Turnaround time

1. Tests no 1-7; 9-14 (Except urine nephridines) – reported every day at 6 hourly intervals from time of receipt of sample at laboratory.
2. Test no 8 –ABG – immediate availability of report
3. Test no 13- Urine nephridines – reported once in 15 days

For Stat parameters: Reported within 2 hours from the time of receipt of sample at laboratory

Parameters	Turnaround time
Random Blood glucose, Fasting Blood glucose, Post prandial Blood glucose (PPBS) & Post glucose blood sugar (PGBS), Urea, Creatinine, uric acid, Sodium, Potassium, Chloride, Total and conjugated Bilirubin, SGOT(AST), SGPT (ALT), ALP, Total protein, albumin, Cholesterol, Triglycerides, HDL, LDL, VLDL, LDH, Iron, Ferritin, UIBC, Magnesium, calcium, phosphorus , Phenytoin, Phenobarbitone, Carbamazepine , Amylase, lipase, CPK, CPK-MB, ADA, Cholinesterase, Lp(a), Homocysteine, Fibrinogen, hsCRP, lactate,microalbumin, Bence Jones proteins, Osmolality, Bicarbonate, D-Dimer, interleukin-6,	Reported within 6 hours from the time of receipt of sample at laboratory
Special Tests: AFP, CA-125, CEA, HCG, PSA, Free PSA	Reported within 24 hours from the time of receipt of sample at laboratory
Metanephrine and normetanephrines	Reported once in 15 days from time of receipt of sample at laboratory
STAT Parameters: Sodium, Potassium, Creatinine, Glucose, Calcium, Total Bilirubin, Magnesium, Carbamazepine, Phenobarbitone, Phenytoin,	Reported within 2 hours from the time of receipt of sample at laboratory
Arterial Blood Gas analysis (ABG)	Immediate availability of report from the time of receipt of sample at laboratory

4.0 LABORATORY REQUEST FORMS, SAMPLE TUBES, URINE BOTTLES AND 24 HOURS URINE CONTAINERS

4.1 General Information

This section deals with the information that is required to be documented on the laboratory request form and the sample bottle prior to the analyses of samples.

4.2 Completing the Request Form

The following essential information must be documented in a legible manner on the request form:-

1. Patient's **Hospital Number** (In-Patient/ Out-Patient Numbers)
2. Patient's **Full Name** (Surname, First name)
3. Patient's **Full Home Address**
4. Patient's **Location** (Hospital Ward or room number). Where the requesting Physician is at an external location to that of the Sri Venkateswara Institute of Medical Sciences, the complete Hospital address to be provided.
5. Patient's **Gender**
6. The name of the **Requesting Clinician**
7. **Specimen type**
8. **Examination(s)** required
9. **Date and time of specimen collection**
10. Relevant **clinical information** appropriate to the test(s) requested must be supplied e.g. history of administration of drugs etc.
11. A clear indication as to whether the tests requested are **STAT** or **routine**

4.3 Labeling the Specimen Container

The following **essential** information should be documented in a **legible** manner on the sample container:-

1. Patient's full name
2. Hospital number
3. Date and time of specimen collection

All of the above indicators are **mandatory**.

4.4 Quality of samples

4.4.1 Quality of Blood Specimens

Laboratory personnel must inspect prior to testing each blood specimen received for:-

- Evidence of hemolysis
- Gross lipemic
- Grossly icteric

In such instances, a **second specimen** may be requested or the **issued report** will have an appended comment noting the presence of haemolysis, lipemia and icterus.

4.4.2 Urine & body fluids- Inadequate samples

4.4.3 24 hours urine sample not appropriately collected

4.4.4 Fasting sample given in non fasting state.

4.5 Further Additional Testing

If on sending a specimen for testing and **further additional testing** is required, please contact the appropriate section of the Biochemistry department to investigate the feasibility of using the initial specimen for analysis as age of specimen may impact on the validity of test results. Ideally, a request form should accompany such a request but the lack of the request form should not impede the processing of an urgent request.

4.6 Non-Conforming Issues and Credit

It is the policy of the Biochemistry department to refund the amount as per policy of institute where non-conforming issues lead to the non testing of samples.

5.0 DELIVERY, PACKING, TRANSPORT AND POSTAL REQUIREMENTS FOR DIAGNOSTIC AND INFECTIOUS (OR SUSPECTED INFECTIOUS) SAMPLES

5.1 General Information

It is the policy of the Biochemistry Department to treat all specimens and samples as potentially infectious or high risk. Therefore, we advise you to take universal precautions in the collection, packaging and the delivery of specimens being sent to the Biochemistry Department for analysis.

5.2 Samples Delivery From Within the Hospital

- During the **routine** Biochemistry opening times **blood samples** will be **collected** by the **Phlebotomy** team in the OPD. The samples are transported by porters at regular intervals (not exceeding 2hrs). The responsibility of proper storage in collection area and transport rests with OPD collection In-charge.
- **Outside routine Biochemistry opening times blood samples** will be taken by either medical doctors or nurses in the ward and transported under controlled temperature by porters without delay.
- All specimens being sent to the laboratory should be placed in a plastic sample box with the biohazard symbol on it.

5.2.1 Procedure for the Out of Hours Delivery and Storage of Samples to Biochemistry

- STAT samples/ emergency : Round the clock reception and processing of samples
- Fluids: Specimen containers stored at 2-8°C in refrigerator in Room No.21 Clinical biochemistry lab

5.3 Specimen Delivery From Outside of the Hospital

Sample receiving and storage similar to 5.2

Samples are accepted directly at the reception of biochemistry, room no 21 on 2nd floor of SVIMS hospital.

5.3.1 Packing Procedure for the Transport of Diagnostic Specimens (Non Infectious)

1. Specimen to be sent should be stored in a secure (preferably plastic) primary container.

2. Wrap the container in tissue or cotton wool which will act as absorbent material in event of any spillages.
3. Place the name, address and contact number of the originator on the outside of the box.
4. Substances needed for the collection of samples will be supplied at the reception of Clinical Biochemistry lab Room no 21.

5.3.2 Procedure for the Transport of Infectious or Suspected Infectious Specimens

1. Specimens or samples suspected or known to contain risk are classified as infectious and are packaged and transported accordingly as outlined below.
2. Samples to be sent should be stored in a secure (preferably plastic) primary container.
3. Wrap the container in tissue or cotton wool which will act as absorbent material in event of any spillages.
4. Place the wrapped primary specimen or sample container inside of the plastic container.
5. Place the container inside the cardboard box.
6. The box should contain Biohazard symbol. Write the name of the suspected microbe being transported in brackets if known.
7. Place the name, address and contact number of the originator on the outside of the box.

5.4 Disposal of Waste Material Used in Specimen Collection

All materials used in specimen collection should be treated as potentially hazardous and discarded using sharps containers and other appropriate color coded bags. Please refer to the current hospital guidelines for Waste Management prepared by the Infection Control Committee.

5.5 Storage of Examined Specimens for Archive and Look Back Purposes

ID	Specimen Description	Storage Requirement	Storage Location	Minimum Retention Period	Responsibility
1.	Blood for routine analysis	Room temperature	Biochemistry clinical lab	12 hrs	Sample separation in charge
2.	Body Fluids and 24 hours urine sample	Room temperature	Biochemistry Clinical lab	24 hrs	Sample separation in charge
3.	Tumor markers	-10°C	Refrigerator in separation room of clinical lab of Biochemistry	15days after release of reports	Technician in charge of special tests

6.0 Repeat Examination due to Analytical Failure or Further Examination of the Primary Specimen

6.1 Repeat Examination due to Analytical Failure

It is the policy of the Biochemistry department in the event of an analytical failure to:-

- Repeat the test using a back-up instrument. **Or**
- Store the sample in appropriate conditions until the cause of the analytical failure is identified and corrected and then repeat the test. The urgency of the outstanding samples is reviewed by the clinical lab faculty.

6.2 Further Examination of the Primary Specimen

Where further testing is relevant to the investigation or diagnosis of the condition or symptoms which gave rise to the original test request then it is the policy of the Biochemistry department to pursue a diagnosis by performance of additional tests using the primary specimen.

6.3 Tests Not Listed

The Department is not directly involved in outsourcing of tests that are not done by the Department.

7.0 REPORTING OF TEST RESULTS

7.1 Reporting of Results within the Hospital

Routine Clinical Biochemistry Samples:

Blood, body fluids & Urine: OUT PATIENT SAMPLE results, once released, are available on the hospital computer system. Hard copy of OP reports is provided at Medical records department near OP sample collection centre. The IN PATIENT SAMPLE reports are entered on HIS with in 6 hrs of the time of receipt of samples to the laboratory .Results of STAT samples is available in 2 hrs.

Tumor markers: Reports are available within 24 hours

Urine nephrines: Reports are available once in 15 days

Stat parameters: Reported within 2 hours from the time of receipt of sample at laboratory

7.2 Reports for External Locations

On producing the bill receipt, the customers can collect the reports as per 7.1

7.3 Telephoned Results

- It is the policy of the Biochemistry Department to telephone reports only when results for specific clinical parameters have reached critical levels.
- Requests for verbal reports are not entertained except in urgent cases.

7.4 Online Reports

Reports are available online as soon as they are entered in HIS if the user downloads Google app and logs on with the UHID number in their cell phones.

8.0 External Third Party Assessment Programme

The Biochemistry Department **participates** in relevant available **external third party assessment schemes**. This includes scheme operated by:-EQAS (CMC, Vellore)

The Biochemistry Department is **committed** to participating in other schemes as they become available and are required to ensure comprehensive assessment of the test repertoire.

9. SAMPLE ACCEPTANCE CRITERIA

Parameter	Sample type	Anticoagulant/ Preservative	Sample collection precautions and patient preparation
Glucose Oral glucose tolerance test(OGTT) :	Plasma Plasma	Sodium fluoride & potassium oxalate Sodium fluoride & potassium oxalate The tube should be shaken gently but thoroughly for complete mixing.	FBS: Sample collected after fasting for 8 to 10 hours PPBS: Sample collected after 2 hours of food intake OGTT: <ol style="list-style-type: none"> 1. Discontinue medications known to effect glucose tolerance. 2. Unrestricted carbohydrate diet and activity 3days prior to the test (atleast 150g/ day) 3. Fasting sample is collected after 10 to 12 hours of fasting, preferably taken between 7 a.m to 9 a.m 4. 75 grams of glucose dissolved in 250ml of water is given to drink slowly for over 5minutes and sample is collected after 2 hours
Bicarbonate	Serum	Nil	<ol style="list-style-type: none"> 1. Sample to be transported in a closed plain tube in an upright position immediately after collection to the lab. 2. In case of delay upto 1 hr, samples to be placed on ice and transported in a closed plain tube in an upright position.
Chloride	serum CSF Urine - random -24 hrs urine	Nil Nil Nil Thymol crystals 500mg	--
Microalbumin	Spot urine	Nil	<ul style="list-style-type: none"> • Morning urine sample, preferably a mid stream clean catch, first voided urine should be collected.

Urea, creatinine, Calcium, phosphorus, proteins, sodium and potassium	24 hrs Urine	Thymol crystals 500mg	<ol style="list-style-type: none"> 1. Add the given preservative (thymol crystals) to the urine collection 10 liters can before starting urine collection. 2. The first early morning urine at 6AM must be voided and discarded on day 1 of the urine collection. 3. Collect the next urine sample in the urine collection can. 4. From now, whenever urine is passed, it must be collected in the urine collection can till 6AM the next day. 5. The next day first early morning sample at 6 AM must be collected. 6. Each time, collect urine in an empty container and transfer slowly into the 24 hrs urine collection can
Calcium Triglycerides Phosphorous Total protein Albumin Iron Magnesium, Tumor markers	Serum	Nil	<ul style="list-style-type: none"> • Sample collected after fasting for 8 to 10 hours
Lactate	Plasma	sodium fluoride & potassium oxalate	<ol style="list-style-type: none"> 1. Subject should be at rest and hand and arm movements to be avoided as physical exercise causes an increase in lactate levels. 2. The collected sample must be transported immediately without any time delay from the point of sample collection to the laboratory placed on ice to avoid changes in lactate levels.
Nephrines	24 hrs Urine	10-15ml of 6MHCl	<p><u>Day 1</u> 9.0 am first urine sample – void (do not collect)</p> <p style="text-align: center;">↓</p> <p>Collect next urine samples in containers → transfer immediately to 24 hrs urine collection can. Now add the preservative to the 24 hrs urine collection can.</p> <p style="text-align: center;">↓</p> <p>From now, whenever urine is passed, it must be collected in the container and then transferred</p>

			<p>immediately to the 24 hrs urine collection can till 6am the next day.</p> <p>Day 2</p> <p>10.0 am – collect urine in container →transfer immediately to 24 hrs urine collection can with preservative</p> <p>↓</p> <p>Stop urine collection</p> <p>PRECAUTION!</p> <ol style="list-style-type: none"> 24 hrs urine preservative is HCl (acid) – Avoid spillage and avoid contact with body! Each time, collect urine in an empty container and transfer slowly into the 24 hrs urine collection can – Avoid splashing of acid!
D-Dimer	plasma	Citrated plasma	<ul style="list-style-type: none"> Samples to be sent immediately to the lab in thermocol box to prevent exposure to extreme temperatures. Requires to be separated and stored at 2-8 C within 2 hours of collection
IL-6	Serum	Nil	

BLOOD COLLECTION TUBES

<u>COMMON LABORATORY TEST</u>	<u>TUBE CAP</u>	<u>ADDITIVE</u>
Glucose and Lactate	Gray	Sodium fluoride and potassium oxalate
<p><u>Blood Chemistry (Serum)</u></p> <p>Urea, Creatinine, Uric acid; Sodium, Potassium, Chloride; Amylase, ADA, CPK, CPK-MB, Cholinesterase, LDH, Lipase;LFT; Lipid profile; Lp(a), Homocysteine; hsCRP; Iron, Ferritin, TIBC, Magnesium, calcium, phosphorus; Phenytoin, Phenobarbitone, Carbamazepine; AFP, CA-125, CEA, HCG, PSA, Free PSA; IL-6</p>	Plain red	No additive
D-Dimer	Light blue	Sodium citrate
Fibrinogen	Lavender ("purple")	EDTA

10. SAMPLES REJECTION CRITERIA

A. Specimen should be accepted only if following criteria are met:

- Properly labeled specimen
- Specimen accepted in appropriate vacutainer/container as per the guidelines and well preserved until tested
- Specimen should be suitable for request and submitted along with complete request form
- Adequate specimen volume as per test protocol
- Adequately prepared patient with respect to test requirements
- Non hemolysed serum/plasma sample

B. Specimen may be rejected in the following situations:

Mismatched sample and /or requisitions- processing personnel should contact appropriate location and give them an opportunity to correct the problem. If the processor is unable to contact the submitter inform the faculty in charge and ask for resample

Unlabelled specimens: the submitter will be notified and requested to identify the sample or submit another specimen

Incomplete label: All the specimen must have the patient required details. Contact the collector to correct any problems.

Contaminated specimen: The concerned person should be called and provided with the opportunity to send a new specimen.

Improper specimen container for requested test: Technician will not perform a test if the specimen is not in the acceptable Container and unsuitable for request.

Insufficient quantity of specimen submitted for the testing required: Contact the collector or the concerned person and have blood redrawn.

Note: All specimens are checked for hemolysis, lipidemic and icterus

Samples grossly hemolysed or grossly lipidemic are rejected and repeat collection is requested. If the problem persists then the samples are reprocessed and the report is released with the appropriate remark.

DEPARTMENT OF BIOCHEMISTRY

CLINICIAN'S HANDBOOK

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Issue No: -----

Issue date: -----2021