

Principle

Intended Use

GLUCm reagent, when used in conjunction with UniCel[®] DxC System(s) and SYNCHRON[®] Systems AQUA CAL 1 and 2, is intended for quantitative determination of glucose concentration in human serum, plasma, CSF or fluids.

Clinical Significance

Glucose measurements are used in the diagnosis and treatment of carbohydrate metabolism disorders including diabetes mellitus, neonatal hypoglycemia, idiopathic hypoglycemia, and pancreatic islet cell carcinoma.

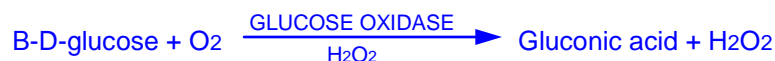
Methodology

The SYNCHRON[®] System(s) determines GLUCm concentration by an oxygen rate method employing a Beckman Coulter Oxygen electrode. (1,2)

A precise volume of sample (10 microliters) is injected in a reaction cup containing a glucose oxidase solution. The ratio used is one part sample to 76 parts reagent. The peak rate of oxygen consumption is directly proportional to the concentration of GLUCm in the sample.(3)

Chemical Reaction Scheme

Oxygen is consumed at the same rate as glucose reacts to form gluconic acid.



Because oxygen consumption rather than peroxide formation is measured, the only requirement for peroxide is that it must be destroyed by a path not leading back to oxygen. The addition of ethanol to the reagent causes peroxide to be destroyed in the presence of catalase without yielding oxygen, according to the following reaction:



To ensure complete destruction of the peroxide, iodide and molybdate are added to the enzyme reagent, causing the following reaction:



The reaction is effective even after the catalase activity has diminished with length of storage.

Specimen

Acceptable Sample Containers

13 x 75 PST, SST and Red Top BD tubes

PST, SST and Red Top BD microtainers

Terumo Grey Top micro containers

13 x 75 Grey Top BD tubes for fasting glucose, glucose loads & glucose tolerance samples

CSF should be submitted in the LP sterile collection tubes. Tube #1 is the preferred tube for chemistry testing.

Fluids should be received in a 13 x 75 Clear Cap BD tube

Type of Specimen

Biological fluid samples should be collected in the same manner routinely used for any laboratory test.(4)
Freshly drawn serum, plasma, CSF, or fluids are the preferred specimens. The use of fluoride as a glycolysis inhibitor is recommended. Whole blood is not recommended for use as a sample.

Specimen Storage and Stability

Tubes of blood are to be kept closed at all times and in a vertical position. It is recommended that the serum or plasma be physically separated from contact with cells within two hours from the time of collection.(5)

Separated serum or plasma should not remain at room temperature longer than 8 hours. If assays are not completed within 8 hours, serum or plasma should be stored at 2°C to 8°C. If assays are not completed within 48 hours, or the separated sample is to be stored beyond 48 hours, samples should be frozen at -15°C to -20°C. Frozen samples should be thawed only once. Analyte deterioration may occur in samples that are repeatedly frozen and thawed. (5)

CSF specimens should be centrifuged and analyzed without delay.

Sample Volume

The optimum volume, when using a 0.5 mL sample cup, is 0.3 mL of sample. For optimum primary sample tube volumes and minimum volumes, refer to the [Primary Tube Sample Template](#).

Unacceptable Specimens

Urine is not acceptable. Refer to the [Procedural Notes](#) section of this chemistry information sheet for further information on unacceptable specimens.

Reagents

Contents

Each kit contains the following items:
Two Glucose Reagent Bottles (2 X 2 L)

Kit Reorder # 472500

Volumes per Test

Sample Volume	10 µL
ORDAC Sample Volume	5 µ
Total Reagent Volume	765 µL

Reactive Ingredients

Reagent Constituents

Glucose Oxidase	150 U/mL
Denatured Ethanol	5%
Potassium Iodide	0.04 mol/L
Ammonium Molybdate	0.03 mol/L

Also non-reactive chemicals necessary for optimal system performance.

Materials Needed But Not Supplied With Reagent Kit

SYNCHRON[®] Systems AQUA CAL 1 and 2
At least two levels of control material
Saline

Reagent Preparation

1. Prior to use, allow the Glucose reagent to equilibrate to room temperature for at least 8 hours. A +25°C water bath may be used to warm reagent.

NOTICE

Do not reuse old reagent or mix fresh reagent with old reagent.

2. Invert reagent 5 times to mix.
3. Inspect for crystals and if present, see instructions for frozen reagent in Reagent Storage and Stability.
4. Date and initial reagent container and document in reagent log before loading each new bottle.

Acceptable Reagent Performance

The acceptability of this reagent is determined by successful calibration and by ensuring that quality control results are within acceptance criteria, as defined in the Clinical Chemistry Quality Control Procedure #3000.T.

Reagent Storage and Stability

GLUCm reagent stored unopened at +2°C to +8°C is stable until the expiration date indicated on each bottle. The reagent is stable on the instrument for 30 days or until the expiration date, if sooner.

If reagent is frozen in transit, thaw completely, warm to room temperature and mix thoroughly by gently inverting bottle at least 10 times.

Equipment

This test is performed on the Beckman UniCel DxC 800 systems; Beckman-Coulter, Brea, California.

Refer to the UniCel DxC 800 systems [Reference Manual](#) for detailed instructions.

Calibration

Calibrator Required

SYNCHRON[®] Systems AQUA CAL 1 and 2
[Kit Reorder #s 471288 and 471291](#)

Calibrator Preparation

No preparation is required.

Calibrator Storage and Stability

If unopened calibrators should be stored at 2°C to 8°C until the expiration date printed on the calibrator bottle. Once opened, the calibrators are stable at room temperature for 30 days.

Repetitive refrigeration of the aqueous calibrators may facilitate crystal formation. Once removed from refrigerated storage, these calibrators should remain at room temperature.

Calibration Information

The system must have a valid calibration in memory before controls or patient samples can be run.

Under typical operating conditions the GLUCm assay must be calibrated every 48 hours or with each new bottle of reagent and also with certain parts replacements or maintenance procedures, as defined in the UniCel DxC 800 Systems [Instructions for Use](#) (IFU) manual.

Calibration may be required if the system is powered down for more than five minutes.

For detailed calibration instructions, refer to the UniCel DxC 800 System [Instructions For Use](#) (IFU) manual.

The system will automatically perform checks on the calibration and produce data at the end of calibration. In the event of a failed calibration, the data will print out with error codes and the system will alert the operator of the failure. The explanation of these error codes can be found in the UniCel DxC 800 System [Instructions For Use](#) (IFU) manual.

Traceability

Glucose (analyte) in this calibrator is traceable to NIST* SRM 917a.

*NIST=National Institute of Standards and Technology

The set point values were established based upon the gravimetric addition of specific quantities of the measurand to achieve the appropriate concentration.

The values are verified using representative samples from each lot of calibrator and are specific to the assay methodologies of the SYNCHRON systems. Values determined by other methodologies may be different. Such differences, if present, may be caused by inter-method bias.

Quality Control

At least two levels of control material should be analyzed each shift. In addition, these controls should be run with each new calibration, with each new bottle of reagent, and after specific maintenance or troubleshooting procedures as detailed in the UniCel DxC 800 System [Instructions For Use](#) manual. More frequent use of controls or the use of additional controls is left to the discretion of the user based on workload and workflow.

NOTICE

Do not use controls containing diethylamine HCl.

The following controls should be used in accordance with the package instructions for use inserts. Quality control results should be evaluated and handled with respect to the Clinical Chemistry Quality Control Procedure #3000.T. Controls are compiled statistically in the LIS and reagent lot changes are documented on DxC Reagent Log sheets.

Quality Control Material

Control	Storage
MAS ChemTrak 1	2°C to 8°C*
MAS ChemTrak 3	2°C to 8°C*

*Controls are received frozen and stored at -10°C to -20°C. Bottles of controls in use are thawed and stored at +2°C to +8°C and are good for 14 days.

Testing Procedure

1. If necessary prepare reagent as defined in the [Reagent Preparation](#) section of this chemistry information sheet and load the reagent onto the system.

2. After reagent load is completed, calibration is required.
 3. Program samples and controls for analysis.
 4. After loading samples and controls onto the system, follow the protocols for system operation.
- For detailed testing procedures, refer to the UniCel DxC 600/800 System [Instructions For Use](#) (IFU) manual.

Calculations

UniCel DxC Systems perform all calculations internally to produce the final reported result. The system will calculate the final result for sample dilutions made by the operator when the dilution factor is entered into the system during sample programming.

If the dilution was programmed in Remisol, the final calculated result from a dilution will not be calculated by the UniCel DxC system but by Remisol.

Reporting Results

Equivalency between the SYNCHRON LX and UniCel DxC 800 Systems has been established. Chemistry results between these systems are in agreement and data from representative systems may be shown.

Reference Intervals

The following reference intervals were taken from literature and a study performed on SYNCHRON Systems.⁽⁷⁾

Reference Intervals

Intervals	Sample Type	Conventional Units	
Literature	Serum or Plasma	74 - 106 mg/dL	
	CSF	40 - 70 mg/dL	
SYNCHRON	Serum or Plasma	74 - 118 mg/dL	
UCDMC	Random Serum or Plasma	0 days to 2 days	60 to 110 mg/dL
	Random Serum or Plasma	> 2 days to 17 yrs	70 to 110 mg/dL
	Random Serum or Plasma	≥ 18 yrs	70 to 110 mg/dL
	Fasting Serum or Plasma	0 days to 2 days	60 to 99 mg/dL
	Fasting Serum or Plasma	> 2 days to 17 yrs	70 to 99 mg/dL
	Fasting Serum or Plasma	≥ 18 yrs	70 to 99 mg/dL
	CSF ^a	40 to 80 mg/dL	

Refer to References (8, 9, 10) for guidelines on establishing laboratory-specific reference intervals.

^a CSF reference intervals are cited from literature. No in-house studies were performed. This information should serve as a general guideline.

A reference interval for fluids has not been determined by UCDHS. This result may be less accurate than for the usual sample type, and should be interpreted in the context of the patient's clinical condition.

Fasting blood sugar (FBS) is defined as the measurement of serum or plasma glucose after a patient has not eaten for 8 to 12 hours (usually overnight).

Fasting glucose values between 100-125 mg/dL suggest an impaired fasting glucose status. Fasting glucose results greater or equal to 126 mg/dL suggest diabetes mellitus.

Non-fasting glucose results greater than 199 mg/dL suggest diabetes mellitus.⁽¹⁶⁾

Critical Values

Glucose results ≤ 40 mg/dL and ≥ 300 mg/dL for newborns (**0 days to 2 days old**) are considered critical values and should be called immediately to the attending physician or charge nurse.

Glucose results ≤ 50 mg/dL and ≥ 300 mg/dL for neonates to teens (**> 2 days to 17 yrs old**) are considered critical values and should be called immediately to the attending physician or charge nurse.

Glucose results ≤ 50 mg/dL and ≥ 500 mg/dL for adults (**≥ 18 yrs old**) are considered critical values and should be called immediately to the attending physician or charge nurse.

Procedural Notes

Anticoagulant Test Results

If plasma is the sample of choice, the following anticoagulants were found to be compatible with this method:

Compatible Anticoagulants

Anticoagulant	Level Tested for In Vitro Interference	Average Plasma-Serum Bias (mg/dL)
Ammonium Heparin	14 Units/mL	NSI ^a
Lithium Heparin	14 Units/mL	NSI
Sodium Heparin	14 Units/mL	NSI
Potassium Oxalate/Sodium Fluoride	2.0 / 2.5 mg/mL	NSI

^a NSI = No Significant Interference (within ± 4.0 mg/dL or 4%).

Limitations

If sodium fluoride is used as a preservative, a decrease of 9 mg/dL is seen during the first 2 hours.⁽⁷⁾ 2.If CSF samples are cloudy or turbid or if CSF samples are visibly contaminated with blood, it is recommended that they be centrifuged before transfer to a sample cup.

Freshly prepared D-glucose solutions or commercial controls spiked with D-glucose must be allowed to mutarotate before analysis for accurate results.

Interferences

The following substances were tested for interference with this methodology:

Interferences

Substance	Source	Level Tested	Observed Effect
Bilirubin (unconjugated)	Bovine	30 mg/dL	NSI ^a
Hemoglobin	RBC Hemolysate	500 mg/dL	NSI
Lipemia	Intralipid ^b	500 mg/dL	NSI

^a NSI = No Significant Interference (within ± 4.0 mg/dL or 4%).

^b Intralipid is a registered trademark of KabiVitrum, Inc., Clayton, NC 27250.

Grossly lipemic samples should be ultracentrifuged and the analysis performed on the infranate.

Refer to References (11,12,13) for other interferences caused by drugs, disease and preanalytical variables.

Performance Characteristics

Analytical Measurement Range

The SYNCHRON System(s) method for the determination of this analyte provides the following analytical ranges:

Analytical measurement Range (AMR)

Sample Type	Conventional Units
Serum/Plasma/CSF/Fluids	10 - 600 mg/dL
Serum/Plasma/CSF/Fluids (ORDAC)	300 - 1200 mg/dL

Clinical Reportable Range:

Clinical Reportable Range (CRR)

Sample Type	Conventional Units
Serum/Plasma/CSF/Fluids	10 - diluted result mg/dL

Samples with concentrations below the AMR and CRR (10 mg/dL) will be reported as “< 10 mg/dL”.
 Samples with concentrations greater than the AMR should be diluted with saline and reanalyzed.

If the dilution was programmed in Remisol, the final calculated result from a dilution will not be calculated by the UniCel DxC system but by Remisol.

Sensitivity

Sensitivity is defined as the lowest measurable concentration which can be distinguished from zero with 95% confidence. Sensitivity for GLUm determination is 10 mg/dL.

Equivalency

Equivalency was assessed by Deming regression analysis of patient samples to accepted clinical methods.

As determined by Beckman

Serum or Plasma (in the range of 26 to 568 mg/dL):

Y (SYNCHRON LX Systems)	= 0.991X - 0.25
N	= 87
MEAN (SYNCHRON LX Systems)	= 193.7
MEAN (SYNCHRON CX7 DELTA)	= 195.8
CORRELATION COEFFICIENT (r)	= 0.9957

Urine (in the range of 7 to 463 mg/dL):

Y (SYNCHRON LX Systems)	= 0.990X - 3.08
N	= 58
MEAN (SYNCHRON LX Systems)	= 197.9
MEAN (SYNCHRON CX7 DELTA)	= 203.0
CORRELATION COEFFICIENT (r)	= 0.9986

Glucose (GLUCm) – Serum, Plasma, CSF, Fluids
 Beckman UniCel DxC Systems

Technical Procedure 3130

CSF (in the range of 24 to 554 mg/dL):
 Y (SYNCHRON LX Systems) = 0.970X + 1.81
 N = 93
 MEAN (SYNCHRON LX Systems) = 182.1
 MEAN (SYNCHRON CX7 DELTA) = 185.8
 CORRELATION COEFFICIENT (r) = 0.9977

Serum or Plasma (in the range of 3 to 571 mg/dL):
 Y (UniCel DxC Systems) = 1.006X - 0.11
 N = 199
 MEAN (UniCel DxC Systems) = 113
 MEAN (SYNCHRON LX Systems) = 112
 CORRELATION COEFFICIENT (r) = 1.000

Urine (in the range of 3 to 600 mg/dL):
 Y (UniCel DxC Systems) = 1.008X + 0.00
 N = 99
 MEAN (UniCel DxC Systems) = 154
 MEAN (SYNCHRON LX Systems) = 152
 CORRELATION COEFFICIENT (r) = 1.000

CSF (in the range of 22 to 552 mg/dL):
 Y (UniCel DxC Systems) = 0.982X + 0.43
 N = 93
 MEAN (UniCel DxC Systems) = 215
 MEAN (SYNCHRON LX Systems) = 219
 CORRELATION COEFFICIENT (r) = 1.000

Refer to References (14) for guidelines on performing equivalency testing.

Equivalency assessed by Deming regression analysis of patient samples to accepted clinical methods.

As determined at UCDCMC

Serum or Plasma (in the range of 22 to 577 mg/dL):
 Y (UniCel Dx800-4118) = 1.025X - 7.9
 N = 28
 MEAN (UniCel Dx800-4118) = 159.4
 MEAN (UniCel Dx800-1805) = 163.2
 CORRELATION COEFFICIENT (r) = 0.9986

Serum or Plasma (in the range of 22 to 577 mg/dL):
 Y (UniCel Dx800-4427) = 1.048X - 11.9
 N = 28
 MEAN (UniCel Dx800-4427) = 159.0
 MEAN (UniCel Dx800-1805) = 163.2
 CORRELATION COEFFICIENT (r) = 0.9986

Serum or Plasma (in the range of 22 to 429 mg/dL):
 Y (UniCel Dx800-4449) = 1.047X - 11.5
 N = 27
 MEAN (UniCel Dx800-4449) = 143.3
 MEAN (UniCel Dx800-1805) = 147.9
 CORRELATION COEFFICIENT (r) = 0.9975

University of California, Davis Health System
 Department of Pathology and Laboratory Medicine
 Automated Chemistry/Urinalysis

Glucose (GLUCm) – Serum, Plasma, CSF, Fluids
 Beckman UniCel DxC Systems

Technical Procedure 3130

Serum or Plasma (in the range of 25 to 444 mg/dL):
 Y (UniCel Dx800-4427) = 0.981X + 3.1
 N = 29
 MEAN (UniCel Dx800-4427) = 162.8
 MEAN (UniCel Dx800-4118) = 162.8
 CORRELATION COEFFICIENT (r) = 0.9996

Serum or Plasma (in the range of 25 to 431 mg/dL):
 Y (UniCel Dx800-4449) = 1.020X - 3.3
 N = 27
 MEAN (UniCel Dx800-4449) = 143.3
 MEAN (UniCel Dx800-4118) = 143.7
 CORRELATION COEFFICIENT (r) = 0.9995

Serum or Plasma (in the range of 25 to 439 mg/dL):
 Y (UniCel Dx800-4449) = 1.003X + 0.0
 N = 27
 MEAN (UniCel Dx800-4449) = 143.3
 MEAN (UniCel Dx800-4427) = 142.9
 CORRELATION COEFFICIENT (r) = 0.9997

Precision

A properly operating SYNCHRON® System(s) should exhibit imprecision values less than or equal to the maximum performance limits in the table below. Maximum performance limits were derived by an examination of the imprecision of various methods, proficiency test summaries, and literature sources.

As determined by Beckman

Maximum Performance Limits

Type of Precision	Sample Type	1 SD	Changeover Value ^a	%CV
		mg/dL	mg/dL	
Within-run	Serum/Plasma/Urine/CSF/Fluids	2.0	100.0	2.0
Total	Serum/Plasma/Urine/CSF/Fluids	3.0	100.0	3.0
Within-run	Serum/Plasma/Urine/CSF/Fluids (ORDAC)	NA ^b	NA	5.0
Total	Serum/Plasma/Urine/CSF/Fluids (ORDAC)	NA	NA	7.5

^a When the mean of the test precision data is less than or equal to the changeover value, compare the test SD to the SD guideline given above to determine the acceptability of the precision testing. When the mean of the test precision data is greater than the changeover value, compare the test % CV to the guideline given above to determine acceptability. Changeover value = (SD guideline/CV guideline) x 100.

^b NA = Not Applicable

University of California, Davis Health System
Department of Pathology and Laboratory Medicine
Automated Chemistry/Urinalysis

Glucose (GLUCm) – Serum, Plasma, CSF, Fluids
Beckman UniCel DxC Systems

Technical Procedure 3130

Precision established at UCDCM

Type of Precision	Sample Type	n	Mean (mg/dL)	1 SD	%CV
DxC800-4118 Within-run	SYNCHRON 1	20	44.8	0.6	1.2
	SYNCHRON 3	20	399.8	4.3	1.1
DxC800-4427 Within-run	SYNCHRON 1	20	44.4	0.7	1.5
	SYNCHRON 3	20	397.9	3.5	0.9
DxC800-4449 Within-run	SYNCHRON 1	20	45.1	0.6	1.4
	SYNCHRON 3	20	403.8	3.1	0.8

Type of Imprecision	Sample Type	n	Mean (mg/dL)	SD	%CV
DxC800-4118 Day to Day	MAS ChemTrak 1	1345	57	2.8	4.9
	MAS ChemTrak 3	1376	340	7.5	2.2
DxC800-4427 Day to Day	MAS ChemTrak 1	1339	57	2.6	4.6
	MAS ChemTrak 3	1376	338	7.5	2.2
DxC800-4449 Day to Day	MAS ChemTrak 1	1352	58	2.7	4.7
	MAS ChemTrak 3	1412	339	8.6	2.5

Comparative Performance

Data for a SYNCHRON LX[®] System evaluated using the NCCLS Proposed Guideline EP5-T2 appears in the table below.(15)

As determined by Beckman

NCCLS EP5-T2 Precision Estimate Method

Type of Imprecision	Sample Type	No. Systems	No. Data Points ^a	Test Mean Value (mg/dL)	EP5-T2 Calculated Point Estimates	
					SD	%CV
Within-run	Serum Control 1	1	80	43.7	1.3	2.9
	Serum Control 2	1	80	397.1	1.7	0.4
	Urine Control 1	1	80	37.1	1.0	2.8
	Urine Control 2	1	80	289.7	1.8	0.6
	CSF Control 1	1	80	35.6	0.8	2.2
	CSF Control 2	1	80	111.4	1.1	1.0
Total	Serum Control 1	1	80	43.7	1.7	3.9
	Serum Control 2	1	80	397.1	4.7	1.2
	Urine Control 1	1	80	37.1	1.5	4.0
	Urine Control 2	1	80	289.7	8.2	2.8
	CSF Control 1	1	80	35.6	1.3	3.6
	CSF Control 2	1	80	111.4	1.9	1.7

^a The point estimate is based on the data from one system, run for twenty days, two runs per day, two observations per run on an instrument operated and maintained according to the manufacturer's instructions.

NOTICE

These degrees of precision and equivalency were obtained in typical testing procedures on a SYNCHRON LX[®] System and are not intended to represent the performance specifications for this reagent.

Additional Information

For more detailed information on UniCel DxC Systems, refer to the [Instructions for Use](#) and [Reference](#) manual.

References

1. Kadish, A. H., Hall, D. A., "A New Method for the Continuous Monitoring of Blood Glucose by Measurement of Dissolved Oxygen", *Clin. Chem.*, 11:869 (1965).
2. Kadish, A. H., Little, R. L., Sternberg, J. C., "A New and Rapid Method for the Determination of Glucose by Measurement of Rate Oxygen Consumption", *Clin. Chem.*, 144:116 (1968).
3. Morrison, B., "Use of the Beckman Glucose Analyzer for Low and High Glucose Values", *Clin. Chem. Acta*, 42:192 (1972).
4. Tietz, N. W., "Specimen Collection and Processing; Sources of Biological Variation", *Textbook of Clinical Chemistry*, 5th Edition, W. B. Saunders, Philadelphia, PA (2005).
5. National Committee for Clinical Laboratory Standards, Procedures for the Handling and Processing of Blood Specimens Approved Guideline, NCCLS publication H18-A, Villanova, PA (1990).
6. National Committee for Clinical Laboratory Standards, Routine Urinalysis and Collection, Transportation and Preservation of Urine Specimens Tentative Guideline, NCCLS publication GP16-T, Villanova, PA (1992).
7. Pagana, K D and Pagana, T J, *Mosby's Manual of Diagnostic and Laboratory Tests 3rd Edition*, Mosby Inc., St Louis, MO (2006).
8. National Committee for Clinical Laboratory Standards, How to Define, Determine, and Utilize Reference Intervals in the Clinical Laboratory Approved Guideline, NCCLS publication C28-A, Villanova, PA (1995).
9. Tietz, N. W., ed., *Fundamentals of Clinical Chemistry*, 6th Edition, W. B. Saunders, Philadelphia, PA (2007).
10. Henry, J. B., *Clinical Diagnosis and Management by Laboratory Methods*, 22nd Edition, W. B. Saunders Company, Philadelphia, PA (2006).
11. Young, D. S., *Effects of Drugs on Clinical Laboratory Tests*, 5th Edition, AACC Press, Washington, D. C. (2000).
12. Friedman, R. B., Young, D. S., *Effects of Disease on Clinical Laboratory Tests*, 4th Edition, AACC Press, Washington, D.C. (2001).
13. Young, D. S., *Effects of Preanalytical Variables on Clinical Laboratory Tests*, 3rd Edition, AACC Press, Washington, D. C. (2007).
14. National Committee for Clinical Laboratory Standards, Method Comparison and Bias Estimation Using Patient Samples, Approved Guideline, NCCLS publication EP9-A, Villanova, PA (1995).
15. National Committee for Clinical Laboratory Standards, Precision Performance of Clinical Chemistry Devices, Tentative Guideline, 2nd Edition, NCCLS publication EP5-T2, Villanova, PA (1992).
16. American Diabetes Association, Position Statement: Diagnosis and Classification of Diabetes Mellitus, *Diabetes Care*, Volume 34, Supplement 1, S62-S69 (January 2011). <http://care.diabetesjournals.org>
17. GLUm, SYNCHRON[®] System(s) Chemistry Information Sheet A18496 AJ, (4/2013), Instruction for use sheet, https://www.beckmancoulter.com/wsrportal/techdocs?docname=/cis/A18496/AJ/EN_GLUCm.pdf

University of California, Davis Health System
 Department of Pathology and Laboratory Medicine
 Automated Chemistry/Urinalysis

Glucose (GLUCm) – Serum, Plasma, CSF, Fluids
 Beckman UniCel DxC Systems

Technical Procedure 3130

Prepared By	Date Adopted	Supersedes Procedure #
Michael Inn	October, 2000	Reformatted

Revision Date	Type of Revision	Revised by	Review/Annual Review Date	Reviewed By
			11/27/2000	G. Kost
			12/28/2001	G.Kost
			10/16/2002	G. Kost
			10/10/2003	S. Devaraj
			10/25/2004	S. Devaraj
			11/28/2005	G. Kost
			09/26/2006	G. Kost
			11/05/2007	G. Kost
			06/16/2008	G. Kost
			09/15/2009	G. Kost
			10/12/2010	G. Kost
12/2010	update	M.Inn	08/12/2011	G. Kost
6/28/2011	Added Fluids as a sample type	M.Inn	08/12/2011	G. Kost
6/29/2011	sensitivity update-PCA16036	M.Inn	08/12/2011	G. Kost
7/14/2011	Update reference & critical values	M.Inn	08/12/2011	G. Kost
12/20/2011	Added reference intervals for fasting glucose		11/16/2011	G. Kost
2/07/2012	Added non-fasting & fasting glucose ADA recommendations	M.Inn	02/07/2012	G. Kost
			09/17/2013	G. Kost
04/09/2014	Normal urine glucose statement	M.Inn		
			08/28/2015	J. Gregg
10/17/2015	Removed urine as acceptable sample type	kdagang	10/26/2015	J. Gregg