THE MEDICAL FOUNDATION
Your Laboratory Experts

Reference Ranges for Analytes in Extravascular Body Fluids

Analyte	Body Fluid	Reference Range	Reference
Amylase			
	Duodenal Fluid (after secretin stimulation)	130-3400 U/min	Heil
	Lymph	50-83 U/L	Valentine
	Pancreatic Juice (after stimulation)	400-1780 U/min	Heil
	Peritoneal Fluid	88-109 U/L	Hannon
Bilirubin	Amniotic Fluid	< 0.1 mg/dL	Campbell
	Bile (clear colorless fluid)	< 1.3 mg/dL	Tsunoda
	Yellow Bile	9-77 mg/dL	Tsunoda
	Coelomic Fluid	< 0.5 mg/dL	Campbell
CEA			
	Amniotic Fluid	< 107 µg/L	Drohse
	Ascites	< 2.5 µg/L (Nonmalignant) > 2.5 µg/L (Malignant)	Heil
	Gastric Juice	< 0.5 µg/L	Borch
Chloride			
	Amniotic Fluid	83-111 mmol/L	Campbell
	Bile (clear colorless fluid)	94-152 mmol/L	Tsunoda
	Yellow Bile	80-144 mmol/L	Tsunoda
	Coelomic Fluid	100-115 mmol/L	Campbell
	Gastric Juice	84-119 mmol/L (6-48 months) 57-137 mmol/L (Adults)	Adamson Heil

THE MEDICAL FOUNDATION
Your Laboratory Experts

Reference Ranges for Analytes in Extravascular Body Fluids			
Analyte	**Body Fluid**	**Reference Range**	**Reference**
Chloride			
	Lymph	85-130 mmol/L	Valentine
	Milk, Human	10.9-14.6 mmol/L	Wack
	Mixed Saliva	5-40 mmol/L	Haeckel
	Sweat	41-102 mmol/L (6-15 yr. Female)	Al-Tamer
		41-100 mmol/L (6-15 yr. Male)	
		71-96 mmol/L (16-25 yr. Female)	
		60-101 mmol/L (16-25 yr. Male)	
		75-100 mmol/L (26-35 yr. Female)	
		71-102 mmol/L (26-35 yr. Male)	
		71-102 mmol/L (36-45 yr. Female)	
		90-103 mmol/L (36-45 yr. Male)	
		75-108 mmol/L (46-55 yr. Female)	
		96-107 mmol/L (46-55 yr. Male)	
	Tears	128 mmol/L	Haeckel
Creatinine			
	Amniotic Fluid	0.2-0.7 mg/dL	Campbell
	Coelomic Fluid	0.4-3.0 mg/dL	Campbell
	Peritoneal Fluid	0.5-2.0 mg/dL	Manahan
	Mixed Saliva	0.07-0.20 mg/dL	Lloyd
Glucose			
	Amniotic Fluid	45-76 mg/dL	Campbell
	Bile (clear colorless fluid)	< 5 mg/dL	Tsunoda
	Yellow Bile	< 8 mg/dL	Tsunoda
	Coelomic Fluid	50-88 mg/dL	Campbell
	Lymph	48-200 mg/dL	Valentine

THE MEDICAL FOUNDATION
Your Laboratory Experts

Reference Ranges for Analytes in Extravascular Body Fluids			
Analyte	**Body Fluid**	**Reference Range**	**Reference**
Glucose			
	Nasal Secretion	< 10 mg/dL	Kosoy
	Pleural Fluid	Equal to Plasma	Boggs
	Mixed Saliva	< 2 mg/dL	Rehak
	Sweat	< 7 mg/dL	Heil
	Synovial Fluid	Equal to Plasma	Heil
	Tears	76-288 mg/dL	Jager
LDH			
	Ascites	< 60% of serum LDH (Nonmalignant) > 60% of serum LDH (Malignant)	Heil
	Gastric Juice	< 35 U/L	Rogers
	Pleural Fluid punctate/serum ratio	< 200 U/L (Transudate) > 200 U/L (Exudate) < 0.6 U/L (Transudate) > 0.6 U/L (Exudate)	Heil
	Mixed Saliva	113-609 U/L	Rehak
	Synovial Fluid	< 240 U/L	Heil
Lipase			
	Duodenal Fluid (after secretin stimulation)	950-7200 U/min	Heil
	Pancreatic Juice (after stimulation)	780-3500 U/min	Heil
Potassium			
	Amniotic Fluid	3.7-4.4 mmol/L	Campbell
	Bile (clear colorless fluid)	3.0-6.6 mmol/L	Tsunoda

THE MEDICAL FOUNDATION
Your Laboratory Experts

Reference Ranges for Analytes in Extravascular Body Fluids

Analyte	Body Fluid	Reference Range	Reference
Potassium			
	Yellow Bile	3.8-5.4 mmol/L	Tsunoda
	Coelomic Fluid	3.5-4.2 mmol/L	Campbell
	Duodenal Fluid	4.2-11.0 mmol/L	Heil
	Gastric Juice	10.7-14.2 mmol/L (6-48 months) 5.0-11.8 mmol/L (Adults)	Adamson Heil
	Lymph	3.8-5.0 mmol/L	Valentine
	Milk, Human	10.6-13.0 mmol/L	Fly
	Nasal Secretion	6-28 mmol/L	Heil
	Pancreatic Juice	3-10 mmol/L	Heil
	Saliva	14-26 mmol/L	Heil
	Mixed Saliva	6.4-37 mmol/L	Rehak
	Sweat	10.7-13.6 mmol/L (6-15yr Female)	Al-Tamer
		11.4-23.2 mmol/L (6-15 yr. Male)	
		18.8-28.2 mmol/L(16-25yr Female)	
		13.5-40.0 mmol/L (16-25 yr. Male)	
		20.0-28.8 mmol/L(26-35yr Female)	
		22.0-43.6 mmol/L (26-35 yr. Male)	
		16.3-33.0 mmol/L(36-45yr Female)	
		28.2-44.8 mmol/L (36-45 yr. Male)	
		23.0-25.2 mmol/L(46-55yr Female)	
		32.8-40.0 mmol/L (46-55 yr. Male)	
	Tears	16 mmol/L	Haeckel
Sodium			
	Amniotic Fluid	139-144 mmol/L	Campbell
	Bile (clear colorless fluid)	138-162 mmol/L	Tsunoda
	Yellow Bile	144-170 mmol/L	Tsunoda

THE MEDICAL FOUNDATION
Your Laboratory Experts

Reference Ranges for Analytes in Extravascular Body Fluids

Analyte	Body Fluid	Reference Range	Reference
Sodium			
	Coelomic Fluid	135-141 mmol/L	Campbell
	Duodenal Fluid	97-153 mmol/L	Heil
	Gastric Juice	60-69 mmol/L (6-48 months) 32-84 mmol/L (Adults)	Adamson Heil
	Lymph	104-108 mmol/L	Valentine
	Milk, Human	4.0-6.0 mmol/L	Fly
	Nasal Secretion	90-148 mmol/L	Heil
	Saliva	10-54 mmol/L	Heil
	Mixed Saliva	2-21 mmol/L	Haeckel
	Sweat	39-102 mmol/L (6-15 yr. Female)	Al-Tamer
		44-105 mmol/L (6-15 yr. Male)	
		77-94 mmol/L(16-25 yr. Female)	
		62-113 mmol/L (16-25 yr. Male)	
		83-98 mmol/L(26-35 yr. Female)	
		75-119 mmol/L (26-35 yr. Male)	
		79-97 mmol/L(36-45 yr. Female)	
		75-136 mmol/L (36-45 yr. Male)	
		92-109 mmol/L(46-55 yr. Female)	
		65-146 mmol/L (46-55 yr. Male)	
	Tears	146 mmol/L	Haeckel
Urea			
	Amniotic Fluid	12-32 mg/dL	Campbell
	Coelomic Fluid	16-41 mg/dL	Campbell
	Gastric Juice	0.7-1.6 mg/dL	Piper
	Lymph	17-36 mg/dL	Valentine
	Peritoneal Fluid	3-27 mg/dL	Manahan

THE MEDICAL FOUNDATION
Your Laboratory Experts

Reference Ranges for Analytes in Extravascular Body Fluids

Analyte	Body Fluid	Reference Range	Reference
Urea			
	Mixed Saliva	17-41 mg/dL	Rehak
	Sweat	56-234 mg/dL	Taylor
Uric Acid			
	Gastric Juice	0.7-1.4 mg/dL	Piper
	Mixed Saliva	0.7-6.0 mg/dL	Rehak
	Sweat	0.2-0.7 mg/dL	Taylor
	Synovial Fluid	Equal to Serum	Heil

REFERENCES

Body Fluid pH Study, South Bend Medical Foundation, Dr. Sun and Dr. Tomec, 1993.

Tietz, Norbeg W. Clinical Guide to Laboratory Tests, pp. 238–239, 438, W.B. Saunders Company, Philadelphia, London, Toronto, Montreal, Sydney, Tokyo, 1990.

Dobkin, E.D., Yeston, N.S., Use of pH Paper to Reflect Gastric pH, pp. 885–886. March 1992.

Dobkin, E.D., Valcour, A., McCloskey, C.R., Allen, L., Kambe, J.C., Gleason, E., Orlando, R., Berger, R., Yeston, N.S., Does pH Paper Accurately Reflect Gastric pH, pp. 985–988, September 1990.

Thomason, J.L., Gelbart, S.M., Monagle, L.M., James, J.A., Broekhuizen, F.F., Is pH Test Paper as Accurate as the Electronic Measurement of the pH of Vaginal Secretions, pp. 1213–1214, May 1990.

Chaffe, A., Which pH Paper? pp. 1189–1191, September 1987.

Kjldsberg, Carl R./8yKnight, Joseph A., Laboratory Examination of Amniotic, Cerebrospinal, Seminal, Servus and Synovial Fluids, ASCP Press 1993, pp 65–142, 159–214, 223–224, 255–261, 265–294.

Campbell J, Wathen N, Macintosh M, Cass P, Chard T, Mainwaring-Burton R. Biochemical composition of amniotic fluid and extraembryonic coelomic fluid in the first trimester of pregnancy. Br J Obstet Gynecol 1992; 99: 563-5.

Drohse H, Christensen H, Myrhoj V, Sorensen S. Characterisation of non-maternal serum proteins in amniotic fluid at weeks 16 to 18 of gestation. Clin Chim Acta 1998; 276: 109-20.

Tsunoda T, Eto T, Furukawa M, Nakata T, Kusano T, Lin Y, et al. Clear and colorless fluid observed druing percutaneous transhepatic gallbladder drainage. Gastroenter Jpn 199; 25: 619-24.

Borch K, REnvall H, Lundin C, Wahren B. Evalutaion of gastric carcinoembryonic antigen analysis as an aid during screening for gastric neoplasia in atrophic gastritis. Gut 1987; 28: 26-32.

Adamson I, Esangbedo A, Abiodum P. Pepsins in protein-energy malnutrition. Enzyme 1988; 39: 44-9.

Piper DW, Fenton BH, Goodman LR. Lactic, pyruvic, ciric, and uric acid and urea content of human gastric juice. Gastroenterology 1967; 53: 42-8.

Rogers K, Roberts GM, Williams GT. Gastric-juice enzymesan aid in the diagnosis of gastric cancer? Lancer 1984; 1124-5.

Valentine VG, Raffin TA. The management of chylothorax. Chest 1992; 102: 586-91.

Fly AD, Uhlin KL, Wallace JP. Major minieral concentrations in human milk do not change after maximal exercise testing. Am J Clin Nutr 1998; 68: 345-9.

Wack RP, Lien EL, Taft D, Roscell JD. Electroyte composition in human breast milk beyond the early postpartum period. Nutrition 1997; 13: 774-7.

Kosoy J, Trieff NM, Winkelmann P, Bailey BJ. Glucose in nasal secreations. Arch Otolaryng 1972; 95: 225-9

Hannon ZJ, Guzick DS. Tubal pregnancy: significance of serum and peritoneal fluid oz-Amylase. Obstet Gynecol 1985; 66: 395-7.

Manahan KJ, Fanning J. Peritoneal fluid urea nitrogen and creatinine reference values. Obstet Gynecol 1999; 93: 780-2.

Boggs DS, Kinasewitz GT. Review: pathophysiology of the pleural space. Am J Med Sci 1995; 309: 53-9.

Haeckel R, Hianecke P. The application of saliva, sweat and tear fluid for diagnostic purposes. Ann Biol Clin 1993; 50: 903-10.

Rehak NN, Cecco SA,, Csako G. Biochemical composition and electrolyte balance of “unstimulated” whole human saliva. Clin Chem Lab Med 2000; 38: 335-43.

Lloyd JE, Broughton A, Shelby C. Salivary creatinine assays as a potential screen for renal disease. Ann Clin Biochem 1996; 33: 428-31.

Al-Tamer YY, Hadi EA. Age dependent reference intervbals of glucose, urea, protein, lactate and electroyltes in thermally induced sweat. Eur J Clin Chem Clin Biochem 1994; 32: 71-7.

Taylor RP, Polliack AA, Bader DL. The analysis of metabolites in human sweat: analytical methods and potential application to investigation of pressure ischemia of soft tissues. Ann Clin Biochem 1994; 31: 18-24.

Jager J, Tromp A, Hooymans JMM, Reistma WD, Smit AJ. Reproducbility of vitrous fluorophotometry in patients with type 1 diabetes mellitus. Ophtalmologica 1997; 211: 209-13.

Heil W, Edelmann J, Kiemstedt W, Zawta B. Reference Ranges for Analytes in Extravascular Body Fluids. Clin. Lab. 2001; 47: 7-16.