

**Solution Manual for Experiments in Physiology 11th Edition
by Woodman Tharp**

ISBN 0321957733 9780321957733

Full link download

Solution Manual:

<https://testbankpack.com/p/solution-manual-for-experiments-in-physiology-11th-edition-by-woodman-tharp-isbn-0321957733-9780321957733/>

Experiments in Physiology

Instructor's Manual

David A. Woodman Gerald D. Tharp

Boston Columbus Indianapolis New York San Francisco Upper Saddle River Amsterdam
Cape Town Dubai London Madrid Milan Munich Paris Montréal Toronto
Delhi Mexico City São Paulo Sydney Hong Kong Seoul Singapore Taipei Tokyo

Senior Acquisitions Editor: Kelsey Churchman **Assistant Editor:** Ashley Williams **Project Manager Team Lead:** Nancy Tabor **Project Manager:** Arielle Grant **Production Management and Composition:** Integra

Copyright ©2015, 2011, 2008 by Pearson Education, Inc., 1301 Sansome St., San Francisco, CA 94111. All rights reserved. Manufactured in the United States of America. This publication is protected by copyright and permission should be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or likewise. To obtain permission(s) to use material from this work, please submit a written request to Pearson Education, Inc., Permissions Department, 1900 E. Lake Ave., Glenview, IL 60025. For information regarding permissions, call (847) 486-2635.

Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in this book, and the publisher was aware of a trademark claim, the designations have been printed in initial caps or all caps.

Safety Notification

The Author and Publisher believe that the lab experiments described in this publication, when conducted in conformity with the safety precautions described herein and according to the school's laboratory safety procedures, are reasonably safe for the student to whom this manual is directed. Nonetheless, many of the described experiments are accompanied by some degree of risk, including human error, the failure or misuses of laboratory or electrical equipment, mismeasurement, chemical spills, and exposure to sharp objects, heat, bodily fluids, blood, or other biologics. The Author and Publisher disclaim any liability arising from such risks in connection with any of the experiments contained in this manual. If students have any questions or problems with materials, procedures, or instructions on any experiment, they should always ask their instructor for help before proceeding.

Contents

Preface iv

Materials and Equipment for Experiments v Sources of Special Supplies and Equipment x

Preface

This instructor's manual contains information needed for preparation of

the lab experiments and evaluation of the results obtained by students. **Materials and Equipment for Experiments**

A comprehensive list of items needed for each teaching unit is provided. In general, the quantities listed are those needed for one laboratory of 20 to 24 students working in teams of 3 to 4 students. However, as different laboratories will utilize different methods and data acquisition systems, not all of the materials and equipment listed may be necessary to carry out the experiments within a unit. **Sources of Special Supplies and Equipment** In

Answers to EXPLAIN THIS!

Questions and Laboratory Report Answers

Sample data, graphs, and answers to questions for each teaching unit are provided. The experimental results represent typical values obtained in

our teaching labs. Your students' results may deviate from these, but they will give you a guideline from which to work.

The questions posed in the laboratory reports are not meant to be all-inclusive for the topic being examined in lab. The questions used are designed to stimulate students' thinking about what they are doing in lab and how their results are related to the theoretical concepts presented in lecture and text. Many other questions could be asked, and each lab instructor is encouraged to devise additional questions that could be included in the lab reports or quizzes.

Data Acquisition Units A description of each data acquisition system featured in the lab manual,

Materials and Equipment for Experiments

In general, the quantities provided are those needed for one laboratory of 20–24 students working in teams of 3–4 students. This list includes material for all activities in every

100 ml 0.5 M urea (3 g/100 ml)

100 ml 0.5 M glycerine (4.6 g/100 ml)

100 ml 0.5 M glucose (9 g/100 ml)

100 ml 0.5 M sucrose (17.1 g/100 ml)

exercise. For the specific materials required for each individual activity, see the materials list that

100 ml 22 M methyl alcohol (70.5 g/100 ml)

100 ml 8.5 M ethyl alcohol (39.1 g/100 ml)

addition to the major suppliers of physiological equipment, this list includes addresses of suppliers of special items that are not readily available.

including Vernier®, PowerLab®, and BIOPAC®. Also included is a chapter correlation table for each system, listing which sensors you will need for the relevant chapters.

We welcome comments from instructors who have used this manual concerning its strengths and weaknesses and changes that would make it more effective for teaching and learning. precedes each activity in the lab manual.

110 small test tubes (10 ml or less)
 6 10-ml graduated cylinders
 100 ml 3 M propyl alcohol (18 g/100 ml)
 100 ml 1.1 M isobutyl alcohol (8.15 g/100 ml)
 100 ml 1.1 M n-butyl alcohol (8.15 g/100 ml)
 100 ml 0.38 M amyl or iso-amyl alcohol (33.5 g/100 ml)

Fundamental Physiological Principles

15 L distilled water

75 ml concentrated HCl and NaOH 3 L phosphate buffer solution
 6 250-ml beakers 3 L distilled water

Paper tissues
 6 Vernier or PowerLab data acquisition units, conductivity probes or pods, and conductivity

2 pH meters (per group) 6 medicine droppers
 6 stirring rods

electrodes
 6 Mac or Windows computers

6 Vernier or PowerLab data acquisition units and pH electrodes
 6 Mac or Windows computers

Renal Physiology
 24 urinalysis bottles 4–
 6 vials Labstix tests 4–6 thermometers 6–12 1qt. Gatorade or Powerade bottles 24 8-oz drinking

Movement Through Membranes

240 ml mammalian blood (citrated or

6 cork borers (8- to 10-mm in diameter) 30 test tubes (15–20 ml) 15 urinometers
 oxalated) 6 microscopes 30 microscope cups
 slides, cover slips, toothpicks, medicine 4–6 large biohazard bags to dispose of urinalysis
 droppers cups and test strips

2 beets (fresh, not canned) 6 potatoes
 12 glass tubing, small bore, 3-ft long

0.4%, 0.2%, 0.1%)

12 ring stands and burette clamps, metric rulers
 12 sacs
 (dialysis tubing), heavy string, tape 30 250-ml
 beakers

350 ml liquid soap solution
 12 100-ml graduated cylinders 6 500-ml
 beakers 24 test tubes, medicine
 droppers 150 ml 20% potassium
 chromate
 200 ml 2.9% silver nitrate in amber bottle
 (make fresh daily)

3 800-ml beakers Methylene blue crystals
 1.8 L 30% sucrose solution with a little Congo
 Red dye 1.8 L 60% sucrose solution with a little
 Congo Red dye NaCl solutions (10%, 5%, 3%,
 2%, 0.9%, 0.6%, 0.5%,

6 types of synthetic urines containing abnormal amounts of glucose, pH, ketones, proteins, and blood

6 vials of Clinitest tablets pHydrion® strips
4–6 ring stands 10 L distilled water Paper tissues

4–6 Vernier or PowerLab data acquisition units and conductivity electrodes

6 Mac or Windows computers

v

vi Materials and Equipment for Experiments

Neuroanatomy (sets)

6 sheep brains with hypophysis and cranial nerves intact 6 dissecting trays

6 sets of dissection instruments (forceps and scalpels) 6 boxes of long handled cotton swabs or Q-tips

6 small vials, each with cotton balls with drops of vanilla, lavender, or other chemicals with strong fragrances

12 pairs disposable latex or nitrile gloves

Models and charts of the central nervous system (spinal cord, spinal cord cross-section, spinal nerves, human brain) Membrane

Action Potentials

live frogs

6 sets of dissection instruments (forceps, scissors, and needles) 12 glass probes

6 2 * 2 in. square pieces of cardboard weighing papers,

3 1-L beakers

1 L each of water at

three temperatures (5°C, 25°C, 45°C) 6

watches that tick loudly

6 stethoscopes

6 512-Hz tuning forks 1-2 audiometers

Coins (pennies, nickels, dimes) Cotton balls

6 sets of oscilloscopes, nerve chambers, and connecting cables

6 PowerLab data acquisition units and cables 6

Mac or Windows computers

6 electronic stimulators (like Grass Technologies

SD-9) and electrodes

6 50-ml beakers and medicine droppers

2 L each of frog Ringer's solution (10°C, 25°C,

35°C) 100 ml 50% ethyl alcohol

100 ml 1% procaine

100 ml 0.3 M KCl solution 6 sets of

Gaskell clamps Cotton string, ice

Reflex Functions

12 reaction time apparatuses 6

stopwatches 1 swivel armchair

with casters removed 6

flashlights

6 reflex hammers

6 BIOPAC® SS10L hand switches

6 pairs of BIOPAC® OUT1 headphones

6 computers with BIOPAC® Student Lab Software

Sensory Physiology I: Cutaneous, Hearing

6 compasses or esthesiometers

6 sets of brass weights (1-, 2-, 5-, 10-, 20-, 50-, 200-g

1 each: analytical balance, triple beam balance,

wound clips and applicator pliers, animal clippers, ear tags

Sensory Physiology II: Vision

6 flashlights

12 3" * 5" unlined cards

6 metric rulers Snellen eye chart

6 dies or other three-dimensional objects

6 needles

Thread

6 sets of colored paper (white, red, green, yellow)

6 Ishihara® test chart books

6 Holmgren's yarn test kits

6 Cenco or Ingersoll eye models with

associated lenses 6 perimeters with

color disks (white, red, blue, green) 24

perimeter charts (left and right eye)

6 cow or sheep eyes (keep frozen until used)

6 sets of dissection instruments (forceps

and scissors) 6 candles

Matches or lighters

1-2 ophthalmoscopes

Reproductive Physiology

4 male rats per group, 75–100 g (needed 2

weeks prior to final lab)

3 female rats per group, 75–100 g (needed 2

weeks prior to final lab)

6 immature female rats or mice (15 to 25 days old)

(needed 1 week prior to final lab)

6 desiccators for isoflurane anesthesia, ether 6

precision balances (0.1 g readability)

6 50 ml isoflurane cones (large test

tubes with cotton) 6 ketamine-

xylazine anesthetic cocktails

12 pairs of heavy gloves Sterile gauze

Cotton

1 scale for weighing rats

Materials and Equipment for Experiments

vii

6 sets of sterile surgical instruments
(forceps and scissors)

18 1-ml insulin syringes 6 hot plates or water baths 6 physiological recorders with muscle transducers 610 adult female rats, 150–200 g
 6 microscopes
 Slides, cover slips, lens paper, toothpicks Thick string Large plastic bags for disposing of rats 6 Dissection instruments
 Curved suturing needles and suture thread 300 ml 6 muscle warmers and aeration apparatuses
 mammalian Ringer's solution 300 ml 70% alcohol (aquarium pumps)
 95% ethanol Giemsa stain 6 37°C water
 Betadine antiseptic

5 ml testosterone, aqueous (Lilly #598, 25 mg/ml) 5 baths
 ml 6 gas anesthesia chambers (desiccators fitted for gassing)
 estrogens, aqueous (Parke Davis Theelin #3540-1, 2 mg/ml) 1 L Locke's solution at 37°C (per

100 ml synthetic urine (0.9% NaCl plus yellow food coloring) group) 250 ml epinephrine (1:10,000)
 250 ml acetylcholine (1:10,000)

100 ml synthetic urine plus 100 units/ml of 250 ml pilocarpine (1:1000)
 chorionic 250 ml atropine sulfate (1:4000)
 gonadotropin 250 ml BaC12 (0.6% solution)

Chorionic gonadotropin, 2500 IU per vial 6 early 250 ml HCl (2% solution)
 pregnancy test strips or other similar commercial 250 ml NaOH (2% solution)
 product 2 L glucose (5.4% solution)
10 Digestion 12 Regulation of Blood Glucose

150 ml salivary amylase sol (400 units per 100 ml) 6 100 Testape strips (Lilly) or similar
 units of product 6 glucometers and test strips
 Sigma A-1031 (Sigma-Aldrich) 24 Unistik-3 single use lancets or
 90 test tubes (15–20 ml) 6 test tube clamps similar single
 6 graduated cylinders (10 ml) -use disposable sterile lancets 20–24
 6 hot plates urinalysis bottles
 6 scalpels Paraffin pH Hydrion strips Solution containing 75 g glucose/500 ml or

6 water baths (at 37°C) with test tube stands 6 hard- commercial glucose tolerance test
 boiled egg 11 Smooth Muscle
 whites 15 ml 1% Motility
 acetic acid

150 ml 1% pancreatin solution in 0.2% Na₂CO₃
 150 ml 0.5% starch paste 75 ml Lugol's solution
 100 ml Benedict's solution 150 ml 5% pepsin
 solution 100 ml 0.5% HCl
 100 ml concentrated HCl 100 ml 0.5% NaOH
 Ice
 500 ml distilled water Litmus powder
 150 ml dairy cream Bile salts

Beveragesuch as Trutol 1 L ml 70%
ethanol

Cotton

13 Measurement of Metabolic Rate

6 respirometers (Collins 1 3.5-L) and
accessories 6 metabolators

1 oxygen tank with regulator, 100% O₂

Soda lime

6 adult rats, (150–200 g)

6 adult mice

6 rat respirometers

6 mouse respirometers	Manometer fluid (Krebs or Brodie)	Animal scales	6 pairs of heavy gloves	24 disposable mouthpieces	70% alcohol	viii Materials and Equipment for Experiments	clamps	6 6-in. metric rulers	String	6 small beakers, medicine droppers	2 L frog Ringer's solution (at room temperature)	15 ml tubocurarine chloride (3 mg/ml) (Sigma T2379)	1 syringe with 23G needle	12 glass probes	6 motor point electrodes	6 EKG plate electrodes, rubber straps	6	
6 Vernier data acquisition units and oxygen sensors	6 Mac or Windows computers	Vaseline																
14 Thyroid Function																		
24 adult male or adult female rats, 150–200 g (needed 2 weeks before lab date)	1 animal scale	6 rat respirometers (desiccators with soda lime)	6 Vernier data acquisition units and oxygen sensors	Vaseline	2000 g thyroid, desiccated 1% in pulverized rat chow	2000 g thiouracil, 0.5% in pulverized rat chow	15 L potassium perchlorate, 1% in drinking water	6 pairs of heavy gloves	6 each: analytical balances, triple beam balances	6 50-ml volumetric flasks	Distilled water	70% alcohol	tubes of electrode paste	6 hand dynamometers				
15 Nerve-Muscle Activity																		
6 live frogs	6 sets of dissection instruments (forceps, scissors, bone cutters)	6 physiological recorders with muscle transducers (Kymograph or Physiograph)	6 electronic stimulators (Grass Technologies SD9)	andsets of stimulating electrodes (handheld)	6 electrode holders	6 PowerLab data acquisition units and force transducers	6 Mac or Windows computers	6 ring stands with tension adjusters	Thread, heavy and light	6 sets of weight pans and weights (5 g)	6 femur							

16 Cardiac Function

6 live frogs or turtles

6 physiological recorders (like Physiograph™) with electronic myograph transducers 4–6 PowerLab data acquisition units and force transducers

6 Mac or Windows computers

6 electronic sets of stimulating electrodes 6 frog boards or turtle boards

3 turtle hooks and bone saws (if turtles are used) 12 insect pins

6 ring stands, clamps, tension adjusters 6 sets of dissection instruments (forceps, scissors, bone cutters, dissecting needles) 50 ml acetylcholine, 0.1 mg/ml (1:10,000)

50 ml ephinephrine, 1 mg/ml (1:1000)

50 ml pilocarpine, 0.2 mg/ml (1:5000)

50 ml nicotine, 1 mg/ml (1:1000)

50 ml atropine, 1 mg/ml (1:1000) 4 L frog Ringer's solution (at room temperature) 4 L frog Ringer's solution (at 37°C)

Squeeze bottles 6 ice baths

6 medicine droppers and 50-ml beakers Beeswax

Materials and Equipment for Experiments **ix**

6 6-in. metric rulers Thin thread

Heavy thread or Gaskell clamp

17 Human Cardiovascular Function

6 physiological recorders (like Physiograph™) with EKG equipment

6 PowerLab or Vernier data acquisition

units with EKG cables and electrodes

6 BIOPAC data acquisition units 6 Mac or Windows computers Recording paper

Printer

6 sets EKG plate electrodes, rubber straps, electrode paste

6 blood pressure sensors and cuffs

6 pulse transducers (or plethysmographs) 6 heart sound microphones

12 stethoscopes and sphygmomanometers

2 1000ml beakers containing ice water 12 protractors

3 tourniquets

18 Respiratory Function

6 physiological recorders with bellows or Impedance (1:10,000)

Pneumographs

6 sets EKG plate electrodes, electrode paste, long rubber straps acetic or lactic acid (0.5%)

(used with Impedance Pneumograph)

6 spirometers and timed or recording vitalometers 6 Douglas

bags with respiratory valves and nose clips

6 Vernier data acquisition units with respiration monitors and 12 microscopes, slides, cover slips 24 prepared

belts, and spirometers

6 BIOPAC airflow transducers (SS11LA) 6 Mac or Windows computers

1 flow meter

6 syringes, 1 ml with 23-G needle 100 ml histamine

100 ml epinephrine or Vasopressin (1:1000) 100 ml

300 ml frog Ringer's solution

20 Blood Physiology II: Leukocytes, Blood Types, Hemostasis

slides of white blood cells 24 hemocytometers and

accessories 24 white blood cell diluting

24 bulb-type pipette fillers

100 ml Turk's solution

12 paper bags (large enough to fit over the head) 1 12-in. stool 30ml Wright's stain
 and buffersolution for
 100 ml 70% alcohol Wright's stain
 24 mouthpieces, disposable for spirometers 50 ml hydrogen peroxide
 (Collins) 24 solution, ether, and 95% ethanol for
 bacterial filters to match mouthpieces cleaning pipettes 1
 19 Blood Physiology I: Erythrocyte L distilled water
 Functions Phosphate buffer 100 blood lancets
 1 microhematocrit centrifuge 30 hematocrit 100 ml 70% ethanol
 tubes (heparinized) 2 hematocrit sealing 24 vials each anti-A, Anti-B, anti-Rho (anti-
 compounds 150 blood lancets D) serum 2 slide warming boxes
 6 Tallquist booklets Toothpicks, cotton, wax pencils 30 capillary
 12 Sahli hemoglobinometers tubes
 30 Sahli pipettes (disposable) and (nonheparinized) 30 ml methyl violet
 suction tubing 1 spectrophotometer solution
 (Spectronic 21) 40 cuvette tubes for 21 Physical Fitness
 spectrophotometer human scale
 6 Vernier data acquisition units and colorimeters grip strength testers (Carolina Biological) 1
 6 Mac or trunk flexibility tester (Carolina Biological)
 Windows computers 2 Fat-O-Meter

cyanmethemoglobin standard solution 24 hemocytometers and each: stepping benches: 12-,
 14-, 16-, 18-, 20- in. high calipers (Carolina Biological) Stopwatches
 12 microscopes, slides, cover slips 1 metronome or timer
 150ml cyanmethemoglobin reagent solution 150
 ml respirometers (Collins 13.5-L) and
 accessories accessories 100% oxygen, soda lime
 24 red cell dilution pipettes 24 bulb-type pipette bicycle ergometers or stepping benches
 fillers 12-16 in. high
 50 ml Hayem's or Gower's solution 100 ml 70% 2 each: stethoscopes,
 ethanol 50 ml hydrogen peroxide solution, ether, sphygmomanometers Watches with
 and 95% ethanol for cleaning pipettes second hands
 1L distilled water 10ml animal blood 6 live frogs
 6 frog boards with holes for viewing web
 22 Physiology of Exercise physiological
 recorders with EKG equipment 2

Sources of Special Supplies and Equipment

AD Instruments Inc.

2205 Executive Circle, Colorado Springs, CO 80906 (888) 965-6040 www.adinstruments.com

PowerLab® data acquisition systems and accessories, Chart and Scope software.

BIOPAC Systems, Inc.

42 Aero Camino

Goleta, CA 93117 (805)

685-0066

www.biopac.com

BIOPAC® data acquisition systems, transducers, software, and curriculum for life science education.

Carolina Biological Supply Company

2700 York Road, Burlington, NC 27215

(800) 334-5551 www.carolina.com

Equipment, kits, and supplies for teaching human physiology.

Craig Medical Distribution, Inc.

1185 Park Center Drive, Building P, Vista, CA 92081 (760) 598-7170 www.craigmedical.com

Urine, pregnancy, and blood test chemicals.

Fisher Scientific Co.

81 Wyman Street, Waltham, MA 02451

(800) 766-7000 www.fishersci.com

Biochemicals and equipment for biology and physiology instruction.

Grass Technologies

200 Metro Center Boulevard - Unit 8, Warwick, RI 02886 (877) 472-7779 (U.S.)/ (855) 554-3184 (Canada) www.grasstechnologies.com

Electronic stimulators, physiological recorders, diagnostic testing equipment, etc.

Harvard Apparatus

84 October Hill Road, Holliston, MA 01760 (800) 232-2380

www.harvardapparatus.com

Physiological recorders, transducers, etc.

Intelitool (of Phipps & Bird)

P.O. Box 7475, Richmond, VA 23221 (800) 955-7621 www.intelitool.com

Computer-interfaced physiological data acquisition systems for Mac and Windows (Spirocomp, Physiogrip, Flexicomp, InteliPulse).

Sources of Special Supplies and Equipment **xi**

Lafayette Instrument Company

P.O. Box 5729, Lafayette, IN 47903 (800) 428-7545 www.lafayetteinstrument.com Equipment for physiological and psychological recording.

MacGill Discount Medical and School Nurse Supplies 1000

N. Lombard Road, Lombard, IL 60148 (800) 323-2841
www.macgill.com

Vision screening charts and hearing testing equipment.

MAICO Diagnostics

7625 Golden Triangle Drive, Eden Prairie, MN 55344 (888) 941-4201 www.maico-diagnostics.com

Audiometers and other audiological instruments.

Sigma-Aldrich Corporation

3050 Spruce Street, St. Louis, MO 63103
(800) 325-3010 (U.S.) / (905) 829-9500 (Canada)
www.sigmaaldrich.com

Biochemical products and assay kits.

Stoelting Company

620 Wheat Lane, Wood Dale, IL 60191 (630) 860-9700 www.stoeltingco.com
Instruments for physiology research and teaching.

Tests for Less

10101 Meandering Way, Fort Smith, AR 72903 www.testsforless.com Home pregnancy tests.

Utech Products, Inc.

135 Broadway, Schenectady, NY 12305 www.utechproducts.com
(800) 828-8324

Cyanmethemoglobin reagents.

Vernier Software & Technology

13979 SW Millikan Way, Beaverton, OR 97005 (888) VERNIER or (888) 837-6437
www.vernier.com

LabPro data acquisition systems, transducers, and Logger Pro software.

World Precision Instruments

175 Sarasota Center Boulevard, Sarasota, FL 34240 (866) 606-1974 www.wpiinc.com

Assorted physiological accessories (stands, transducers, electrodes, etc.).

Answers to EXPLAIN THIS! Questions

Chapter 5: Membrane Action Potentials

Page 52/Page 55

In terms of normal body function, describe how Ringer's solution helps in the function of the nerve, and use this information to answer the question "What normal tissue of the body does Ringer's solution replace?"

Ringer's solution is an isotonic solution used to facilitate and maintain normal body function without creating electrolyte imbalances that could affect cell, tissue, and organ function. It can be used to replace blood in order to maintain fluid volumes and pressure, if necessary.

Chapter 7: Sensory Physiology I: Cutaneous, Hearing

Page 77

The ability to localize sound is a consistent behavior observed in humans. How do the ears allow us to localize sound and what brain structures are involved in helping us to accurately turn our heads toward the source of the sound?

If the sound source is closer to one ear than the other, it will be perceived as being a louder sound in the closer ear. The difference in sound intensity perceived between ears allows us to localize the sound. Further, neurons in the inferior colliculi located on the dorsal surface of the midbrain help us turn our heads accurately towards the source of sound by controlling head and neck muscle movements.

Chapter 8: Sensory Physiology II: Vision

Page 88

We have three types of cones, those sensitive to the colors red, green, and blue. How do you explain how we see more than three colors? Use specific colors like purple and brown to explain your answer.

The photoreceptors in the eye respond to a multitude of wavelengths emanating from the object being viewed reflecting light. If a brown object is being viewed, both red-sensitive and green-sensitive cones are being stimulated; if a purple object is being viewed, both red-sensitive and bluesensitive cones are being stimulated. It is estimated that we can see tens of millions of colors due to the differential stimulation of our three cone types.

Chapter 10: Digestion

Page 113

In addition to the two functions of HCl listed in the paragraph above, what other nondigestive function does HCl play?

HCl plays a role in protecting the body from illness by killing pathogens commonly found on our food.

Chapter 12: Regulation of Blood Glucose

Page 123

Why are fasting blood glucose levels a better indicator of pancreatic function than any randomly obtained blood glucose level?

Blood glucose levels obtained at random times would reflect the variation in diet and time since the meal was consumed, making diagnosis and interpretation of the results very difficult. Fasting blood glucose levels standardize pancreatic function more accurately, leading to more reliable interpretation of the results obtained.

Chapter 22: Physiology of Exercise

Page 269

Why do muscle fibers need more oxygen if they work harder?

Since muscles require ATP for contraction and aerobic respiration—which produces ATP—requires oxygen, the harder muscles work, the more oxygen they require to meet their increased ATP demand.