

From Bench to Bedside

HS

In this issue of the *ACRP Monitor*, three articles have been selected as the basis for a Home Study test that contains 30 questions. For your convenience, the articles and questions are provided in print as well as online (members only) in the form of a PDF (requires Adobe Reader and text file). This activity is anticipated to take three hours.

Answers must be submitted using the electronic answer form online (members only, \$27). Those who answer 70% of the questions correctly will receive an electronic statement of credit by e-mail within 24 hours. Those who do not pass can retake the test for no additional fee.

Hardware/Software Requirements: Home Study tests require version 4.x browsers or higher from Internet Explorer, Mozilla Firefox, or Safari. A browser that can run Adobe Flash 9.0 is required to view the digital edition of *The Monitor*, and Adobe Acrobat is required to view PDFs of the Home Study test.

The **February 2010 Monitor Home Study** is based on the following three articles in this issue:

- 1. The Future of Bringing Drugs from Bench to Bedside**
Jonathan Peck, MA, President and Senior Futurist, Institute for Alternative Futures and Alternative Futures Associates
- 2. Preclinical Animal Models: A Clinical Perspective**
Joseph Giuliano, BSN, RN, Director of Clinical Operations, CHDI Foundation, Inc.
- 3. The Case for Personalized Medicine**
Edward Abrahams, PhD, Executive Director, Personalized Medicine Coalition I
Mike Silver, PhD, Founder and Principal Consultant, Synaptix Communications

HOME STUDY LEARNING OBJECTIVES

With knowledge inferred from the articles above, respectively, learners will be able to:

1. recognize the opportunities and challenges facing drug research and development over the coming decades.
2. discuss the pros and cons of using animal models in drug development.
3. describe what personalized medicine is and how it is currently applied in the practice of medicine.

CONTINUING EDUCATION INFORMATION

The Monitor home study tests offer ACRP, nursing, pharmacy, and continuing medical education credits.



The Association of Clinical Research Professionals (ACRP) provides 3.0 continuing education credits for the completion of this educational activity. These credits can be used to meet the certification maintenance requirement under provider number ACRP-2010-HMS-001.



Continuing Medical Education: The Association of Clinical Research Professionals (ACRP) is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

ACRP designates this educational activity for a maximum of 3.0 AMA PRA Category 1 credits™. Each physician should only claim credit commensurate with the extent of their participation in the activity.



Continuing Nursing Education: The California Board of Registered Nursing (Provider Number 11147) approves the Association of Clinical Research Professionals as a provider of continuing nursing education. The CBRN program number is 11147-10-001. Each home study offering grants 3.0 nursing credits.

DISCLOSURES

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QUESTIONS 1–10

The Future of Bringing Drugs from Bench to Bedside

- 1** Theory in biology can best support drug discovery if it
- comprehends disease for avatar intelligence.
 - explains upward and downward causation.
 - shows molecular and cellular mechanisms.
 - describes how receptors work.
- 2** A knowledge technology infrastructure could
- replace human scientists.
 - provide decision support programs.
 - have interactive avatars solve problems.
 - credit scientific papers with thousands of authors.
- A. 1, 2, and 3 only
B. 1, 2, and 4 only
C. 1, 3, and 4 only
D. 2, 3, and 4 only
- 3** A worse future for drug discovery and development could include
- drug sponsors emphasizing small benefits and hiding large harms.
 - newer biological theories.
 - public acceptance of drug advertising.
 - pharma terrorists.
- A. 1 and 2 only
B. 1 and 4 only
C. 2 and 3 only
D. 2 and 4 only
- 4** Key actions to improve drug development include
- a secure data market including data from successful and failed trials.
 - key scientists working in therapeutic area silos.
 - EMRs to facilitate better study designs.
 - development and use of biomarkers.
- A. 1, 2, and 3 only
B. 1, 2, and 4 only
C. 1, 3, and 4 only
D. 2, 3, and 4 only
- 5** The best option for drug development over the next decade is
- improved efficiency to test more compounds faster.
 - expanded popular support for innovative technologies.
 - exploratory INDs and extensive Phase IV safety studies.
 - better study designs for preventive, targeted, and blockbuster drugs.

6 The passage of the Food and Drug Administration Amendments Act of 2007 (FDAAA 2007) may

- be the most significant legislation since 1962.
- create a drug safety czar.
- allow reimportation of drugs.
- permit generic versions of biologics.

7 “Hollow government syndrome” means

- FDA addressing complex problems without needed funding.
 - regulators unable to stay abreast of science.
 - not having enough scientists at FDA.
 - private enterprise must complete all drug development.
- A. 1 and 2 only
B. 1 and 4 only
C. 2 and 3 only
D. 3 and 4 only

8 The hopeful scenario for drug regulation in the first half of this century has

- minimal government oversight.
 - prevention more central than treatment.
 - personalized risk assessment.
 - safety problems causing public outrage leading to new regulations.
- A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 3 and 4 only

9 The history of drug development and regulation is

- the only real basis for anticipating the future.
 - a success for industry and public health.
 - important but insufficient for anticipating the future.
 - a warning of the potential for harm in a growing population.
- A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 3 and 4 only

10 The future for drug discovery, development, and regulation is

- a way to realize what success looks like.
 - a prediction of how drugs will move from bench to bedside.
 - unknowable and not worth investigation.
 - a way to realize what failure can bring.
- A. 1 and 2 only
B. 1 and 4 only
C. 2 and 3 only
D. 3 and 4 only

QUESTIONS 11–20

Preclinical Animal Models: A Clinical Perspective

11 Typical reasons for using preclinical animal models for drug development are to:

- determine target engagement.
 - reliably predict human results.
 - gain data on off-target effects.
 - use invasive techniques for analysis.
- A. 1, 2, and 3 only
B. 1, 2, and 4 only
C. 1, 3, and 4 only
D. 2, 3, and 4 only

12 Not only do animal models approximate what happens in human disease, they also:

- have the same genetics as humans.
- can develop disease characteristics faster than humans.
- can determine whether a drug will work in humans.
- have no genetic regulatory processes to hamper experiments.

13 What characteristic of murine models makes them useful for measuring survival endpoints?

- Relatively short life span
- Favorable genetic characteristics
- Ability to manipulate drug exposure
- Organ pathology

14 Animal models are used to screen potential drug candidates because they:

- can predict which drugs will work in humans.
- have high predictive validity, especially for anticancer drugs.
- allow for better use and prioritization of resources.
- show which potential side effects will occur in humans.

15 What is animal husbandry?

- The form in which an animal is given a drug
- The most important factor that contributes to validation
- The ability of an animal model to predict human behavior
- The conditions in which animals are bred and raised

16 Which validation process involves determining the animal model's ability to predict an outcome in the human condition?

- A. Face
- B. Predictive
- C. Construct
- D. Intuitive

17 Which validation process is the most challenging to do objectively?

- A. Face
- B. Predictive
- C. Construct
- D. Intuitive

18 Which of the following statements best describes Face Validity?

- A. It involves the repeating of human physiologic processes in animal models.
- B. It can stand on its own if there is exact congruency between human and animal behavioral measures.
- C. It is achieved when biomarkers can be used in both animal and humans and get the same results.
- D. It indicates how well an animal model recapitulates human physiologic measures.

19 Which of the following are important variables to standardize in animal studies?

- 1. Gender and age
- 2. Environmental conditions
- 3. Animal strain
- 4. Statistical power

- A. 1, 2, and 3 only
- B. 1, 2, and 4 only
- C. 1, 3, and 4 only
- D. 2, 3, and 4 only

20 Which of the following best describes the appropriate use of animal models in clinical development?

- A. They can provide the strongest evidence for moving forward clinical development.
- B. They are an important tool in realizing the full potential of translational medicine.
- C. They are the best predictor of human physiologic outcomes.
- D. They provide an equivalence with human endpoints and should be developed to better predict clinical trial results.

QUESTIONS 21–30 The Case for Personalized Medicine

21 Personalized medicine may be considered an extension of traditional approaches to understanding and treating disease through the use of

- A. X-ray diagnostic images.
- B. physical signs and symptoms.
- C. individual molecular makeup.
- D. comparative claims analysis.

22 A measure of the success of personalized medicine will be seen when there is

- A. a shift in medicine from reactive treatment to prevention.
- B. an increased focus on monitoring for compliance in treatment.
- C. better recognition of the failure of products in development.
- D. an emphasis on trial and error selection of treatment options.

23 The test used to look for BRCA1 and BRCA2 genetic mutations is an example of

- A. a test that is generally unaccepted due to misunderstanding.
- B. a molecular marker for specific hereditary cancer risks.
- C. genetic testing having no impact on prevention plans.
- D. unnecessary testing that could lead to higher medical costs.

24 On average a drug is effective in only

- A. 70% of patients.
- B. 60% of patients.
- C. 50% of patients.
- D. 40% of patients.

25 Studies have linked differences in patient response to drugs to the differences in genes that code for

- 1. drug-metabolizing enzymes.
- 2. drug transporters.
- 3. drug targets.
- 4. drug formulations.

- A. 1, 2, and 3 only
- B. 1, 2, and 4 only
- C. 1, 3, and 4 only
- D. 2, 3, and 4 only

26 The potential impact of personalized medicine could include

- A. increased cost of healthcare.
- B. improvement in clinical development time and cost.
- C. increased hospitalizations from adverse drug reactions.
- D. increased noncompliance to chronic medications.

27 Interest in personalized medicine in both the U.S. and EU has led to

- 1. less inclusion in medical education curricula.
- 2. more regulatory focus on specific applications of biomarkers.
- 3. increased government policies.
- 4. dedicated professional associations.

- A. 1, 2, and 3 only
- B. 1, 2, and 4 only
- C. 1, 3, and 4 only
- D. 2, 3, and 4 only

28 The regulatory system is integrating genetic testing into the labels of pharmaceutical products to

- 1. minimize adverse effects of medications.
- 2. minimize diversion of controlled substances.
- 3. improve the chances of effective treatments.
- 4. improve reimbursement policies.

- A. 1 and 3 only
- B. 1 and 4 only
- C. 2 and 3 only
- D. 2 and 4 only

29 Personalized medicine could have the greatest impact on which areas?

- 1. Treatment of chronic diseases such as diabetes
- 2. Detection of clinical trial fraud
- 3. Compliance with life style changes and medications
- 4. Regulatory scrutiny of clinical development programs

- A. 1, 2, and 3 only
- B. 1, 2, and 4 only
- C. 1, 3, and 4 only
- D. 2, 3, and 4 only

30 Using genetic tests to preselect patients for studies could help researchers in which of the following ways?

- 1. Eliminate need for a large clinical trial pool
- 2. Provide for use of only those subjects most likely to respond
- 3. Allow for choice of subjects least likely to suffer side effects
- 4. Reduce the size, time, and expense of trials

- A. 1, 2, and 3 only
- B. 1, 2, and 4 only
- C. 1, 3, and 4 only
- D. 2, 3, and 4 only

CORRECTIONS

Corrections to Home Studies can be found on the ACRP website and are incorporated directly into the online test.