

Case Western Reserve University – University Program Medical School

Becoming A Doctor Block 1 (5 Weeks) Population Health, Epidemiology, Biostatistics, Health Disparities Field Experiences Assessment Week	2 Weeks Steps2Success	The Human Blueprint Block 2 (11 Weeks) Endocrinology, Reproduction, Development, Genetics, Molecular Biology, Cancer Biology Integrative Week Assessment Week	Food to Fuel Block 3 (9 Weeks) Gastroenterology, Nutrition, Biochemistry Assessment Week	Homeostasis Block 4 (14 Weeks) Cardiovascular, Pulmonary, Renal, Cell Physiology and Pharmacology Clinical Immersion Week Assessment Week
Structure (Anatomy, Radiology and Histopathology) Foundations of Clinical Medicine (Tuesday Seminars, Communications, Physical Diagnosis, Patient Based Experiences)				

BLOCK 2: Action Report 2023

1. Course Description

Block 2 describes cellular, tissue and organismal development and function in the context of the expression of the genome, the DNA blueprint that specifies the characteristics of each individual.

The block covers the foundational disciplines of Molecular Biology, Genetics, Hormone Signaling and Embryology/Development that are used to describe the clinical disciplines of Endocrinology, Reproduction and Cancer.

Students will be provided a conceptual framework for understanding the fundamental molecular, cellular, and physiological mechanisms that underlie human health and disease.

The foundational and clinical disciplines are integrated through three major themes: 1) genetic changes (mutations) that lead to disease and their patterns of inheritance; 2) the regulation of gene expression and signal transduction at the cellular level and the phenotypic consequences of dysregulation, and 3) the normal transmission of hormonal signals between cells and organs and how disruption of communication causes disease states.

Block 2 also incorporates concepts from Bioethics at multiple points including informed consent, respect for autonomy, beneficence/nonmaleficence, and justice; and foundational concepts in pharmacology.

Core Disciplines: covered throughout the block

- Molecular Biology
- Genetics
- Hormone action: inter- and intra-cellular signaling
- Developmental Biology/Embryology
- Bioethics
- Pharmacology

Clinical disciplines: covered in specific weeks; incorporate fundamental disciplines

- Endocrinology
- Reproduction
- Cancer

2. Block Leadership

Leader: Sam Mesiano, Ph.D. (Reproductive Biology, CWRU)
 Co-leader: Laure Syyed Kassem, M.D. (Endocrinology, VA)
 Block manager: Nivo Hanson

Dr Wise resigned in April/May 2022 and transitioned responsibilities to Dr. Mesiano.
 Dr Wise supervised the 2022 Block 2 schedule and roster of lecturers.
 Dr Mesiano was appointed Leader of Block 2 in July 2022.

3. Design Team Members

Ron Conlon, Ph.D. (Development; Genetics & Genome Sciences CWRU)
 George Dubyak, Ph.D. (Cell Biology; Physiology & Biophysics, CWRU)
 Jonatha Gott, Ph.D. (Molecular Biology; Biochemistry, CWRU)
 *Craig Hodges, Ph.D. (Genetics and Genome Sciences, CWRU)
 Smitha Krishnamurthi, M.D. (Cancer Biology, CCLCM)
 Sam Mesiano, Ph.D. (Reproductive Biology; CWRU)
 *Marsha Michie, Ph.D. (Bioethics, CWRU)
 Aditi Parikh, M.D. (Genetics; CWRU/UHHS)
 Jacob Scott, M.D./Ph.D. (Cancer Biology, CCLCM)
 Shashirekha Shetty, Ph.D. (Genetics; CWRU/UHHS)
 Rachel Weiserman, M.D. (Reproductive Biology, CWRU; Ob/Gyn UHHS)
 Jennifer Yoest, M.D. (Cancer Biology; Pathology, CWRU/UHHS)

* New members on the Block 2 Design Team in 2022

4. Block Objectives:

Competency and Definition	Educational Program Objective (EPO)	Block 2 Goals	Recommended Changes
<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>1. Understand the basic mechanisms of DNA replication and transcription including the impact of chromatin structure and epigenetic marks as well as the roles of <i>cis</i>-acting signals and <i>trans</i>-acting factors.</p>	<p>None</p>

<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>2. Understand the mechanisms through which gene expression is regulated at multiple steps including transcription, RNA processing and translation and the impact of mutations that lead to disease due to faulty regulation</p>	<p>None</p>
<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>3. Understand the genetic basis and inheritance patterns (traditional and non-traditional) that lead to disease states including congenital defects and cancer; these include the consequences of mis-segregation of entire chromosomes, insertions, or deletions of portions of chromosomes, and point mutations that affect single genes</p>	<p>None</p>

<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>4. Understand the technical advances that led to the development of personalized medicine and describe how the results of genetic tests can be used to assess prognosis and treatment options for a growing number of diseases including congenital defects and cancer</p>	<p>None</p>
<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>5. Understand the principles and pathways of signal transduction and how disruption of intra- or intercellular communication leads to diseases including endocrine disorders and cancer</p>	<p>None</p>
<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>6. Understand the normal synthesis, targets, regulation, and mechanisms of action of hormones and the molecular, cellular and tissue changes that accompany diseases that result from dysregulation of hormone production or targeting</p>	<p>None</p>

<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>7. Understand the normal development of a human embryo and describe how it is altered in developmental disorders that result from mutations or environmental factors</p>	<p>None</p>
<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>8. Understand human reproduction including male and female gametogenesis, neuroendocrine control of sexual development, hormonal control of pregnancy and parturition and methods of contraception</p>	<p>None</p>
<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>10. Understand how DNA sequence alterations and epigenetic changes, defects in DNA repair pathways and dysregulation of signal transduction pathways lead to cancer, as well as the impact of cancer on public health</p>	<p>None</p>

<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>11. Understand cancer treatment options including surgery and radiation; cytotoxic chemotherapy; targeted therapies including those based on monoclonal antibodies and small molecules, as well as their modes of action</p>	<p>None</p>
<p>Common to all Blocks:</p>	<p>EPO</p>	<p>Block 2 Goals</p>	<p>Recommended Changes</p>
<p>Knowledge for Practice Demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences as well as the application of this knowledge to patient care</p>	<p>Demonstrates ability to apply knowledge base to clinical and research questions</p> <p>Demonstrates appropriate level of clinical and basic science knowledge to be an effective starting resident physician</p>	<p>Recognize and analyze ethical problems in clinical medicine and biomedical research using the principles of autonomy, beneficence, nonmaleficence and justice.</p>	<p>None</p>
<p>Teamwork & Interprofessional Collaboration Demonstrates knowledge and skills to promote effective teamwork and collaboration with health care professionals across a variety of settings</p>	<p>Performs effectively as a member of a team</p>	<p>Develop and practice the knowledge and skills that promote effective teamwork across a variety of settings.</p>	<p>None</p>

<p>Professionalism Demonstrates commitment to high standards of ethical, respectful, compassionate, reliable, and responsible behaviors in all settings, and recognizes and addresses lapses in behavior</p>	<p>Commonly demonstrates compassion, respect, honesty and ethical practices</p> <p>Meets obligations in a reliable and timely manner</p> <p>Recognizes and addresses lapses in behavior</p>	<p>Understand and practice the behaviors of an ethical, respectful, compassionate, reliable, and responsible physician.</p>	<p>None</p>
<p>Interpersonal & Communication Skills Demonstrates effective listening, written and oral communication skills with patients, peers, faculty and other health care professionals in the classroom, research, and patient care settings</p>	<p>Uses effective written and oral communication in clinical, research, and classroom settings</p> <p>Demonstrates effective communication with patients using a patient-centered approach</p> <p>Effectively communicates knowledge as well as uncertainties</p>	<p>Understand and demonstrate effective communication skills for learning and clinical practice environments.</p>	<p>None</p>
<p>Research & Scholarship Demonstrates knowledge and skills required to interpret, critically evaluate, and conduct research</p>	<p>Analyzes and effectively critiques a broad range of research papers</p> <p>Demonstrates ability to generate a research hypothesis and formulate questions to test the hypothesis</p> <p>Demonstrates ability to initiate, complete and explain his/her research</p>	<p>Analyze, critique and present research studies from the primary literature.</p>	<p>None</p>

5. List the specific course changes you made this year based on last year's report.

What changes were made in 2021-22?	How did the changes work?	What would you like to change next year 2023-24?
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<u>IQ Cases:</u> Most IQ cases underwent minor modifications aimed mainly at updating resources.	IQ cases continue to be a strength.	IQ resources will continue to be updated to stay abreast of developments in the various disciplines included in Block 2
<u>TBLs/ALTs:</u> None	None	None
<u>Lectures & Schedule:</u> Schedule was set to maximize harmonization with IQ cases.	Generally good. We did the best we could do given the limits imposed by lecturer availability.	More hands on guidance and resources to lecturers in each discipline to help harmonize content between lecturers and with IQ cases and include interactive learning activities.
<u>Review sessions:</u> None	None	None
<u>End of Block Evaluations:</u> None	None	None

6. What changes do you anticipate making to the Block next year (AY 2023-2024)?

Design team:

Roster for 2023 is unchanged. Dr Gott will begin to hand over responsibility for molecular biology to Dr Hodges.

Schedule:

As the 2023 schedule is developed, efforts, as usual, will be focused on harmonizing lectures, IQ cases, reviews, and clinical and basic science correlation sessions. Time allocated for specific disciplines will not change.

Focus on core concepts:

A common complaint from students is that the Block 2 subject matter is disparate, and it is difficult to know what to focus on and the depth of study expected for each discipline. One cause of this problem is that core concepts are sometimes obscured by extraneous material presented in lectures. To address this problem, we will provide lecturers with the specific core concepts that they are expected to cover for their specific discipline. They will also be provided the IQ cases corresponding to their specific discipline. Lecturers will be expected to emphasize and focus on the core concepts and how they relate to the discipline generally and in a peripheral manner to the specific IQ cases for the week. The latter will depend on whether the lecture occurs before or after the students have access to the IQ cases. It is important that each lecturer be aware of the context of their presentation from the students' perspective. Group meetings will be held with lecturers in each discipline to harmonize lecture content and emphasize core concepts. Guidance and recommendations as described above will be conveyed to highlight the importance of focusing on specific areas that students are required to master. Extraneous

material and personal experience is not discouraged provided that it does not soak up too much time and does not distract from core concepts.

Interactive lecture tools:

Block 2 lecturers will be encouraged to include interactive tools into presentations. In 2022 molecular biology and genetics concepts were augmented by Active Learning in Teams (ALT) sessions that students were required to attend. Feedback for ALTs was generally positive and it was clear that the teaching approach was successful. A goal for AY 2023-2024 is to have all lecturers include some similar interactive elements into their presentations.

7. What successful, innovative components of your block that are best practices that you would like to share with the other Blocks?

Activities during week 10 as described above.

8. What specific changes (lectures, TBL, IQ cases, other) do you plan to make to the course next year?

Changes anticipated for next year	Reason for changes (evidence)
<p><u>Goals and LOs:</u> Ensure that Weekly Goals align with lecture LOs, IQ LOs and ALT LOs. and that the goals provide a conceptual framework that is less granular than the specific LOs for individual sessions</p>	<p>Negative comments from student feedback highlighting that weekly goals and IQ and lecture LOs were not aligned. This will help the students and lecturers maintain focus.</p>
<p><u>IQ cases:</u> In addition to the standard annual IQ resource updates, we will carefully examine each IQ case to ensure that references to lectures included in the version provided to facilitators reflect the current schedule</p>	<p>Response to feedback from IQ Facilitators.</p>

9. Please review your Block objectives. Have you added or deleted major concept areas to your Block?

The overall goals, disciplines and concept areas of the block are unchanged.

11. Describe how faculty teaching quality was reviewed for your block. What faculty development opportunity was offered in response to student feedback?

Overall, teaching evaluations were strong. The distribution of scores for lecturers rated at the end of the block were very similar. No action is warranted at this time.

14. Academic Productivity

Nothing to report.

15. Acknowledgements

We thank:

Dr Jo Ann Wise who led Block 2 until May 2022.
the past and present members of the Block 2 Design Team
faculty members who contributed to the block as lecturers, IQ facilitators, and ALT facilitators.
course manager, **Nivo Hanson**, for shepherding the Block 2 team towards its goals
support received from the office of assessment, especially **Kathy Dilliplane**
Kelli Qua for overseeing assessments and feedback
Celinda Miller for overseeing IQ cases and facilitators
the AV and IT technical support teams: **Paul Salzgeber**, **Megan Slabach**, and **Darin Johnson**