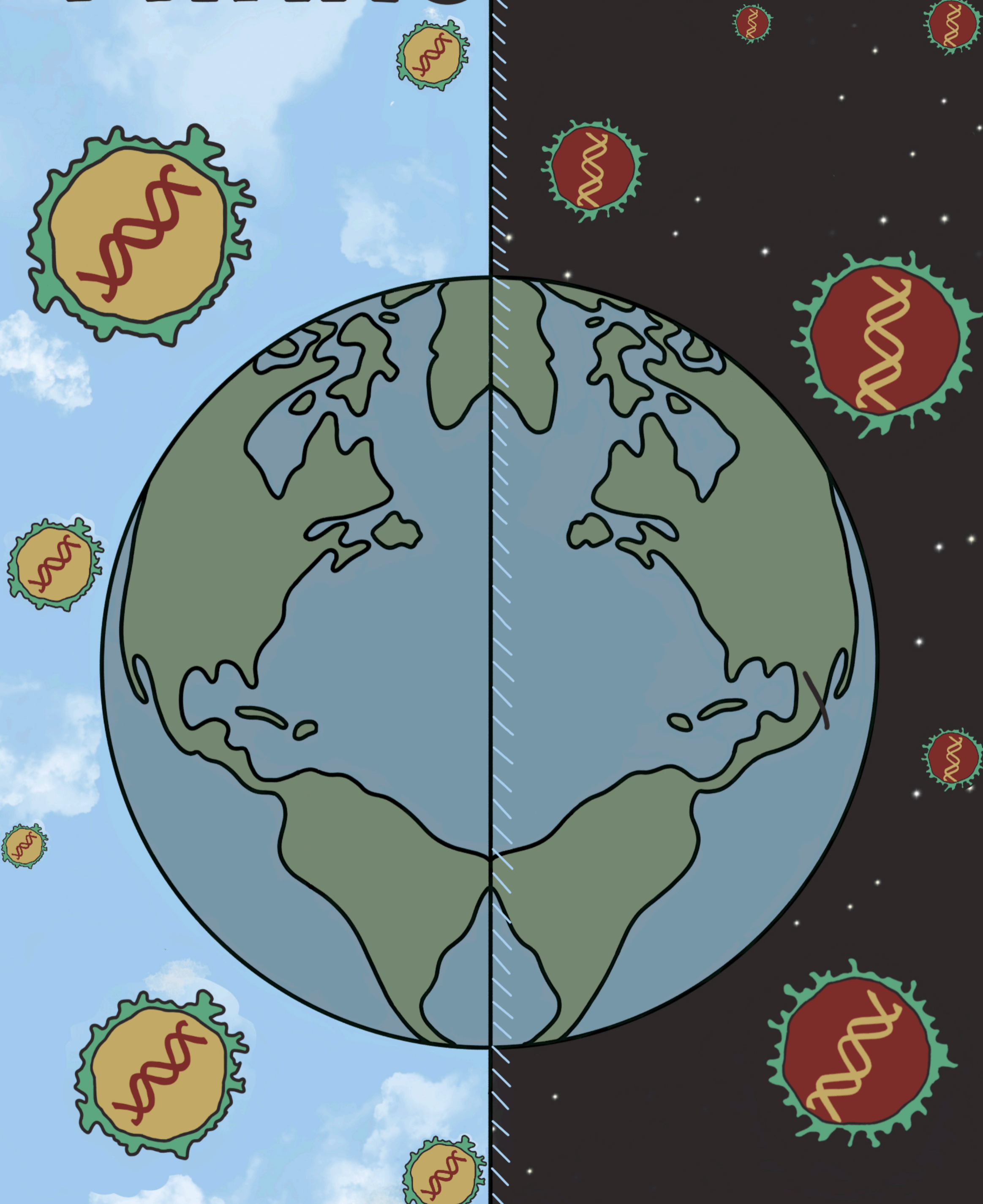


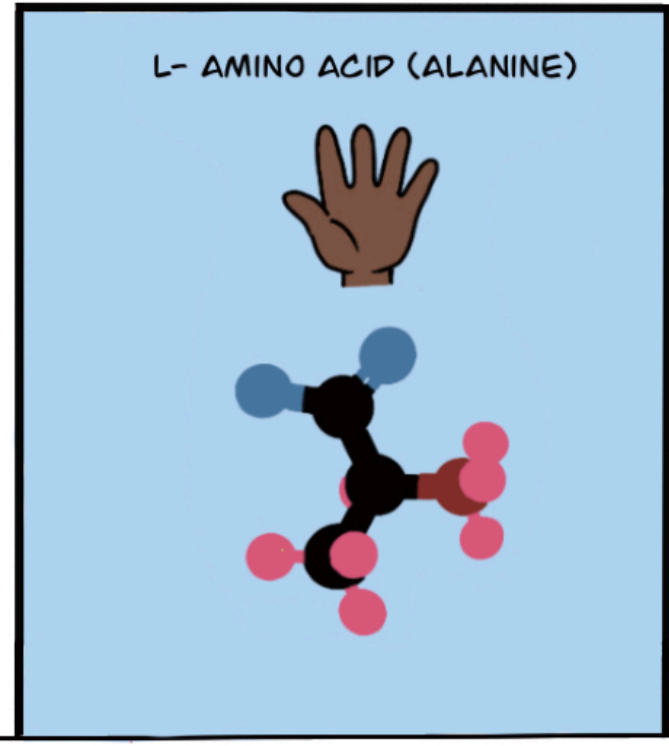
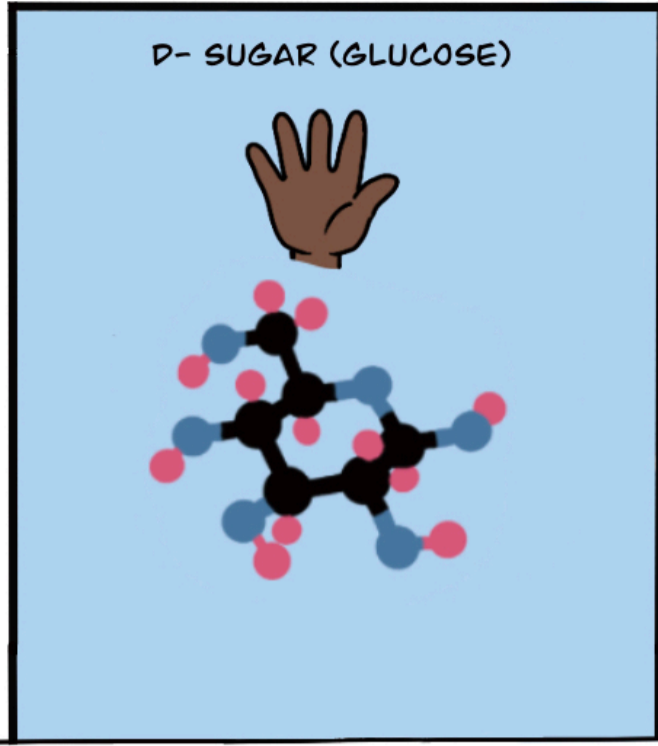
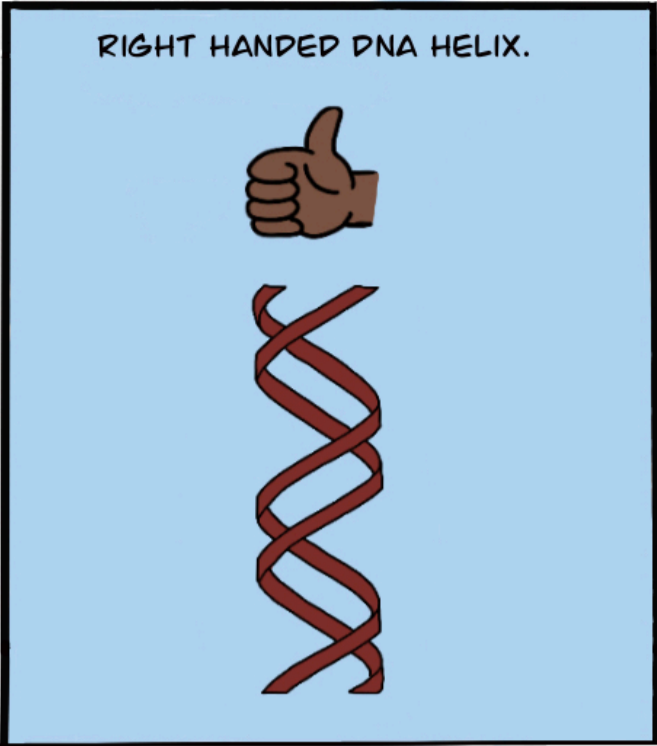
MIRROR LIFE



CONCEPT, STORYLINE, AND CONTENT BY KETAN THORAT, PHD
ILLUSTRATIONS, DESIGN AND FRAMING BY MEETALI BARHATE
CREATIVE SUGGESTIONS BY TANYA SARAWAGI
CONTACT: KETANT@INSTEM.RES.IN

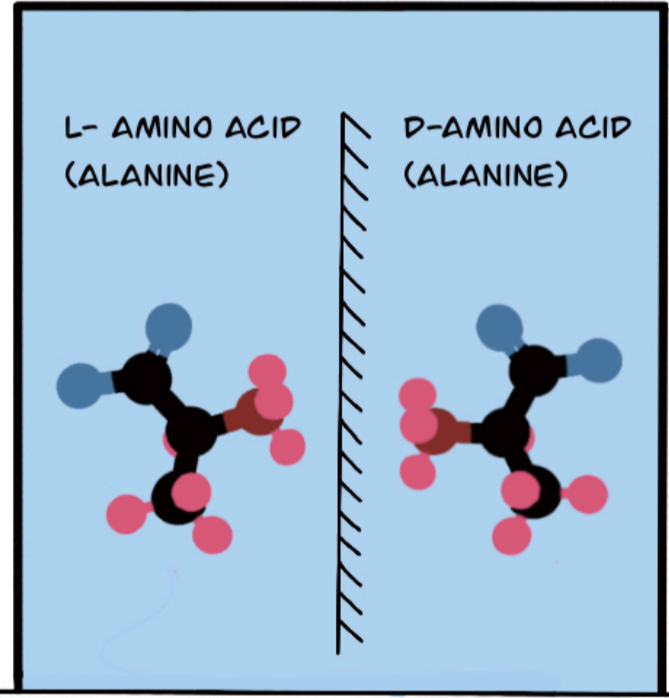
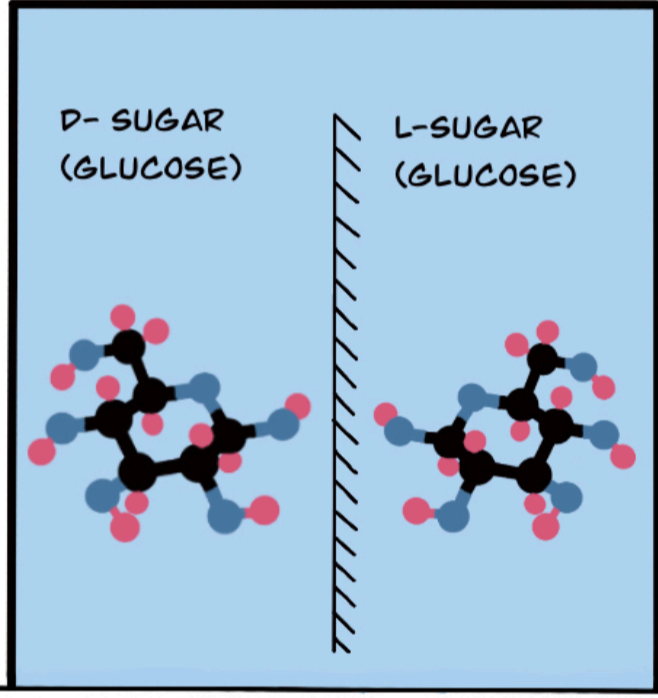
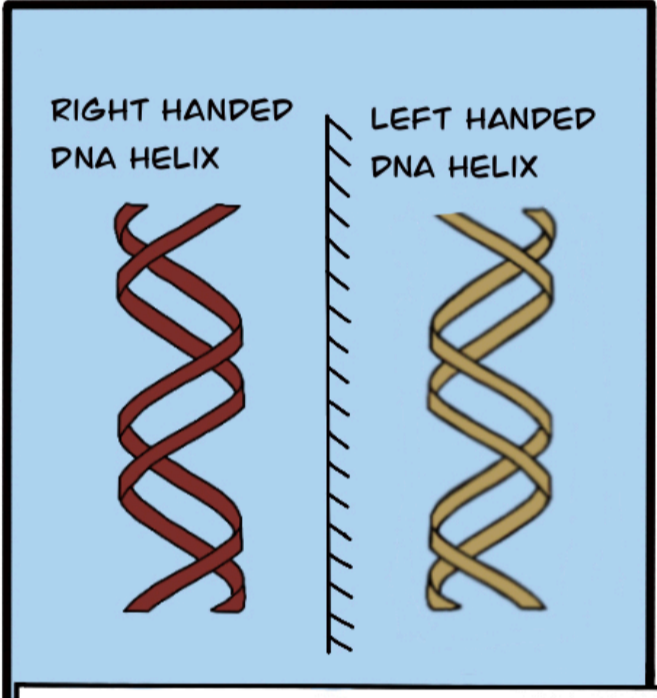
IN COLLABORATION WITH
BiOPREVAIL

DID YOU KNOW?
THE FUNDAMENTAL MOLECULES OF LIFE HAVE A HANDEDNESS- JUST LIKE YOUR LEFT AND RIGHT HAND



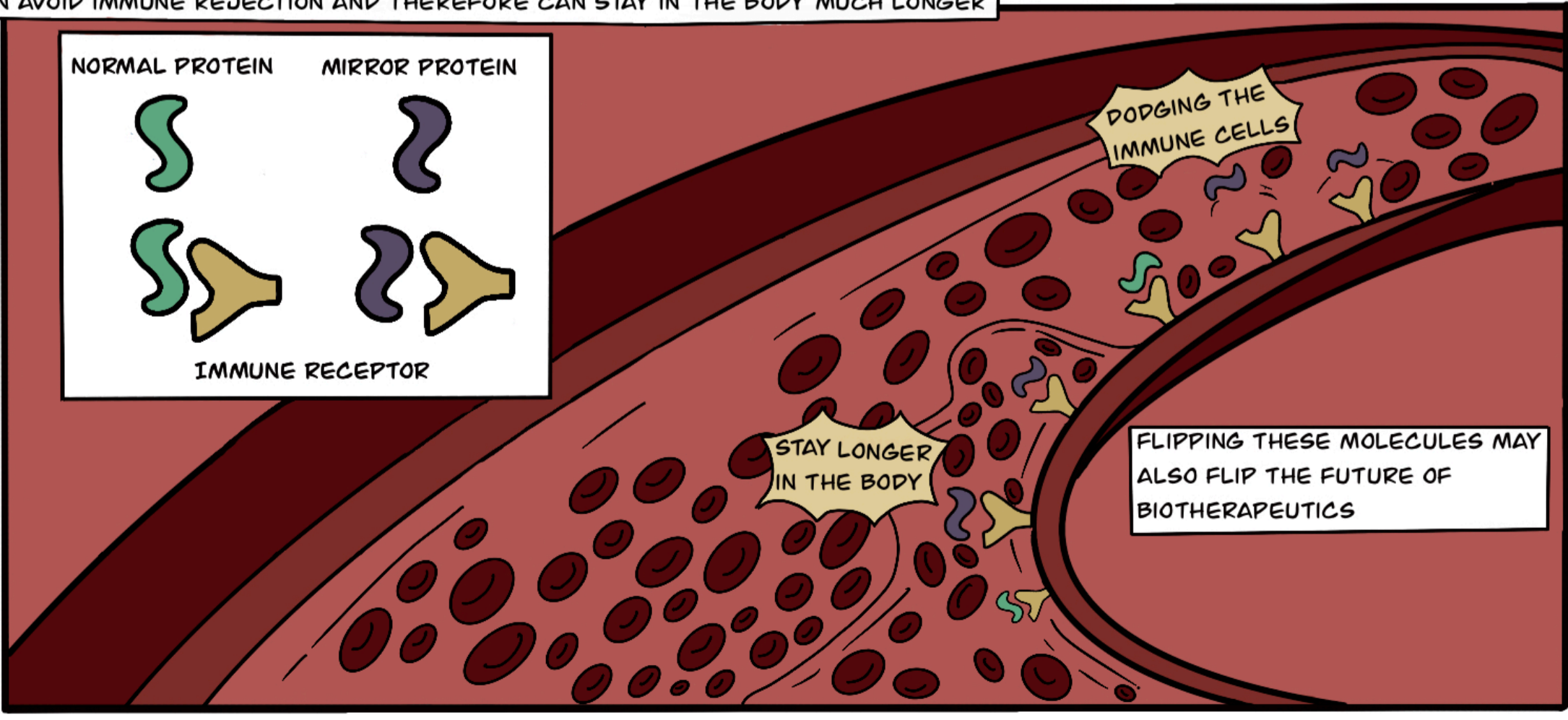
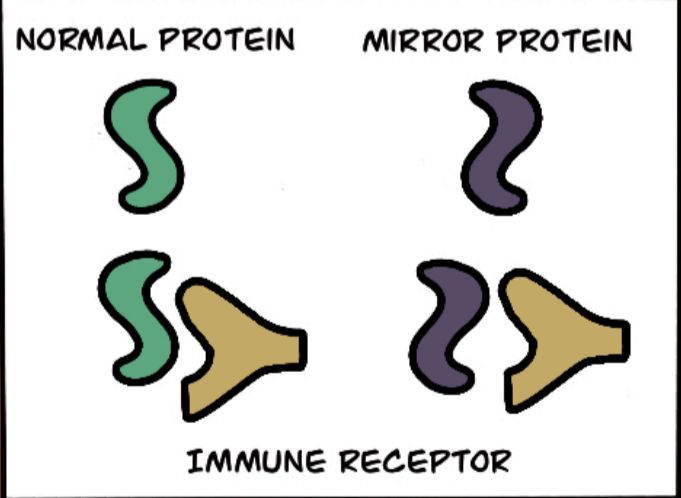
THE LIFE ON EARTH ONLY USES LEFT-HANDED AMINO ACIDS AND RIGHT -HANDED SUGARS AND DNA. THAT'S CALLED 'CHIRALITY'

BUT THE SCIENTIST CAN NOW CREATE THEIR MIRROR TWINS WITH RIGHT HANDED AMINO ACIDS AND LEFT HANDED DNA

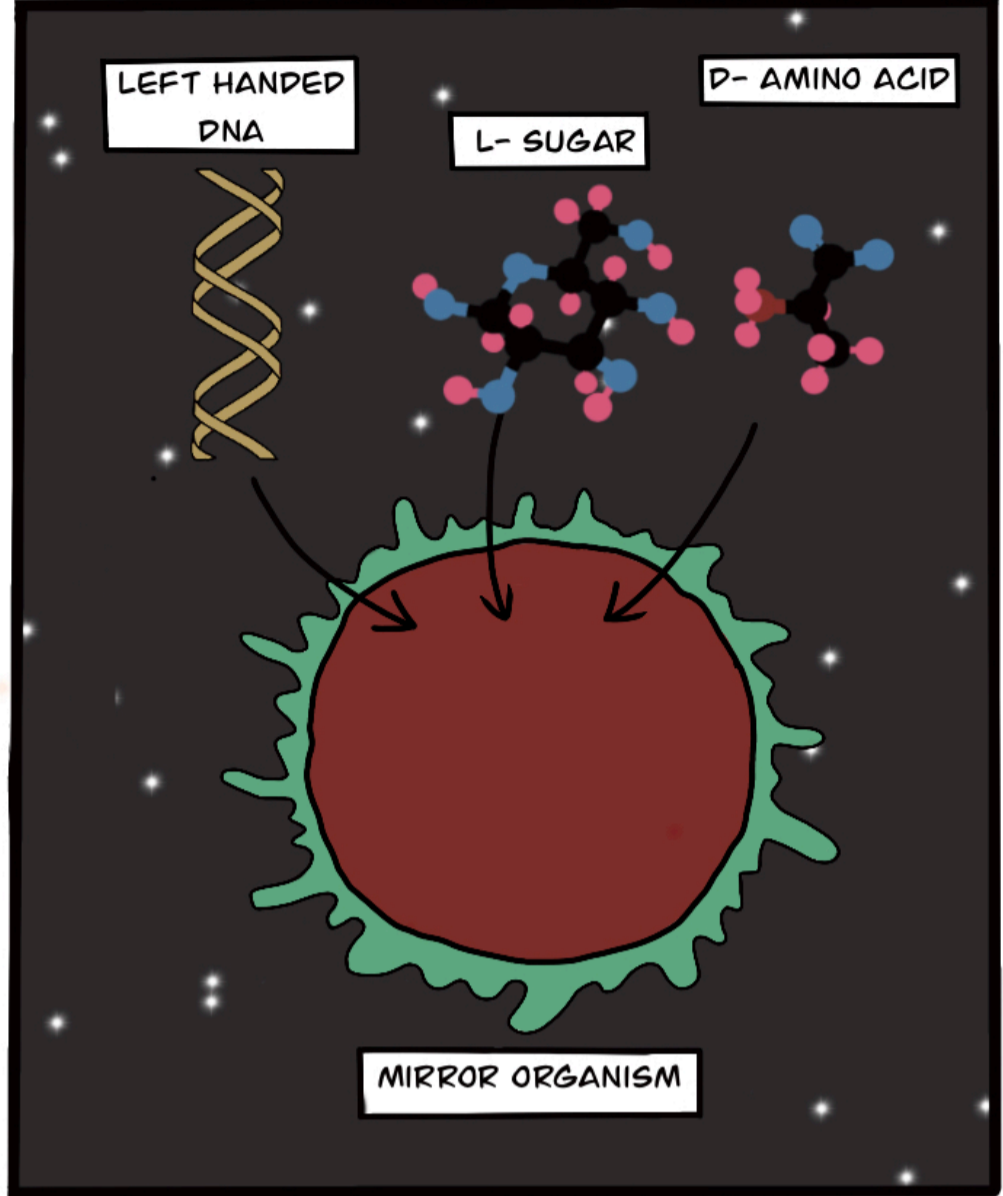
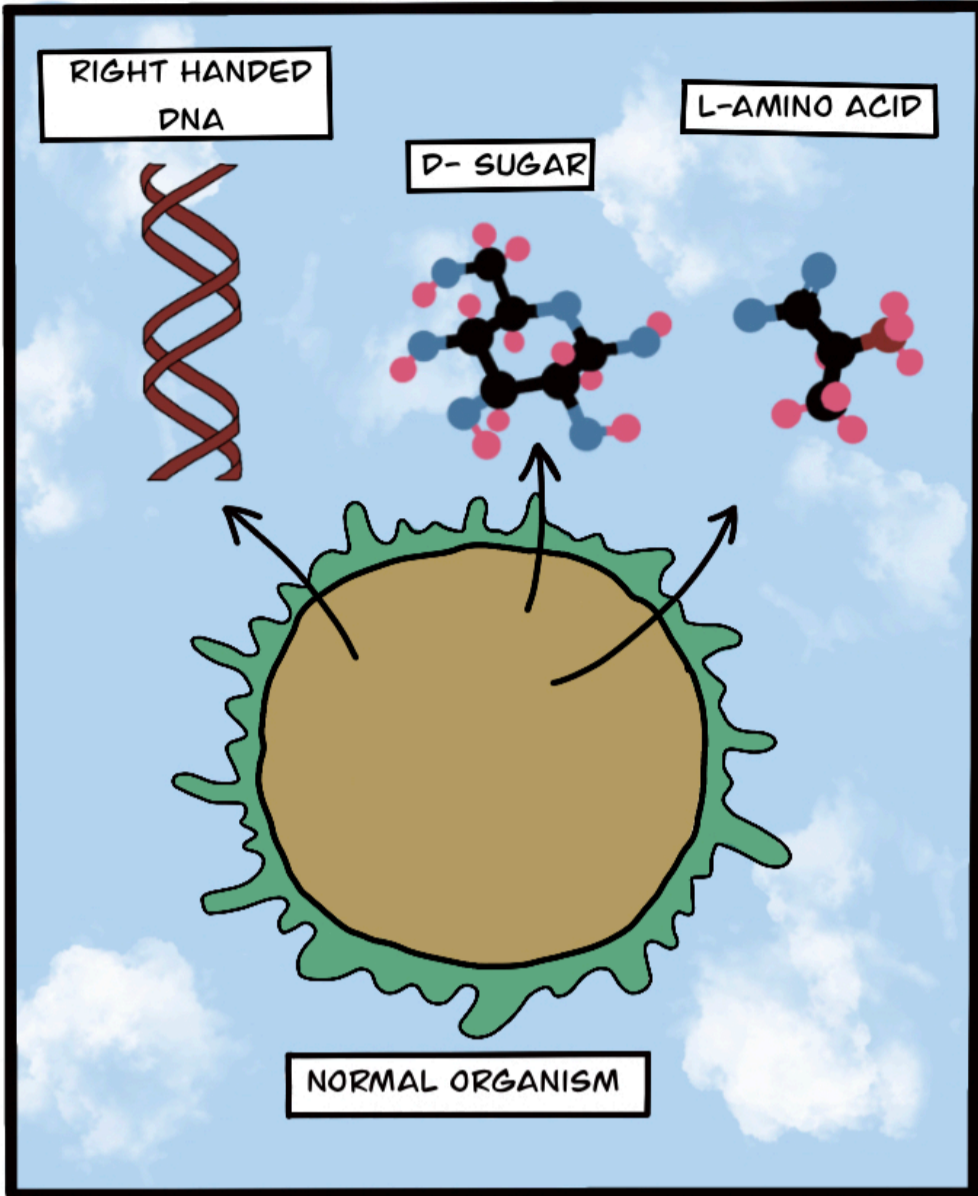


THESE 'MIRROR MOLECULES' MOSTLY AREN'T USED BY LIFE NATURALLY, BUT THEY MAY BE GAME CHANGERS IN MEDICINE

MIRROR MOLECULES HAVE POTENTIAL ADVANTAGES IN BIO THERAPEUTICS AS THEY CAN AVOID IMMUNE REJECTION AND THEREFORE CAN STAY IN THE BODY MUCH LONGER



WHAT IF WE TAKE ALL THESE MIRROR MOLECULES AND USE THEM TO BUILD A MIRROR ORGANISM?



SCIENTIST CREATING MIRROR ORGANISM

IF LIFE WORKS ONE WAY.... CAN WE FLIP IT AND MAKE IT WORK IN MIRROR?

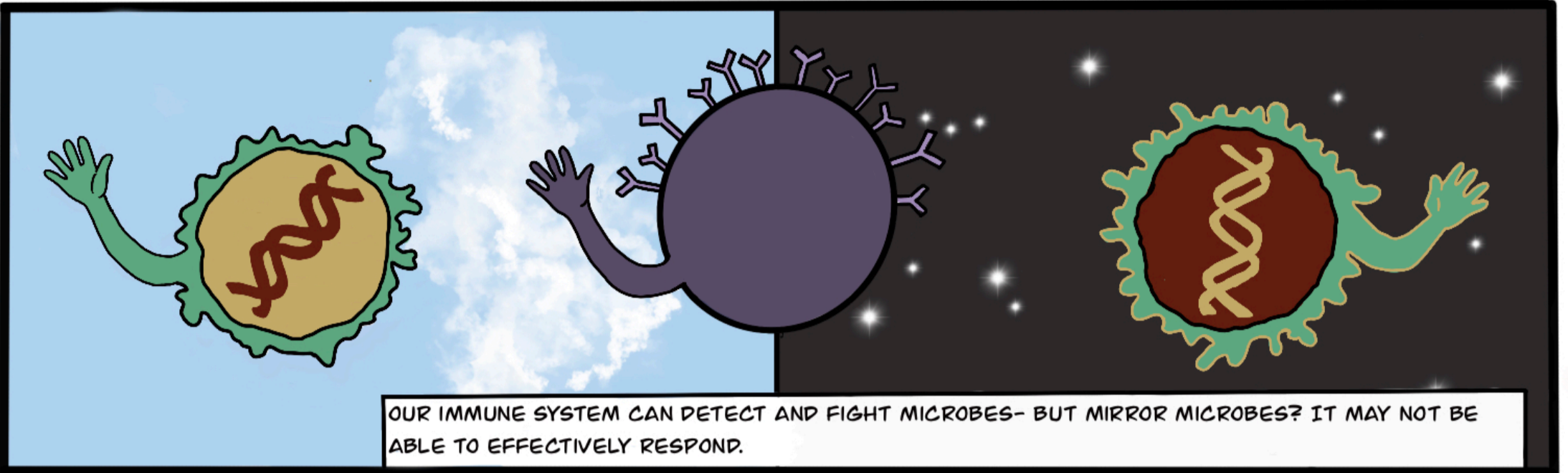
CREATING MIRROR DNA
TASK INITIATED

1. THEY CAN USE ACHIRAL NUTRIENTS IN NATURE TO SURVIVE
2. GIVEN TIME, THEY COULD EVOLVE AND DIVERSIFY INTO ENTIRELY NEW MIRROR SPECIES

SCIENTISTS ARE NOW EXPLORING HOW TO MAKE MIRROR BACTERIA IN THE LAB. ORGANISMS BUILT FROM SYNTHETIC, MIRRORED BUILDING BLOCKS.

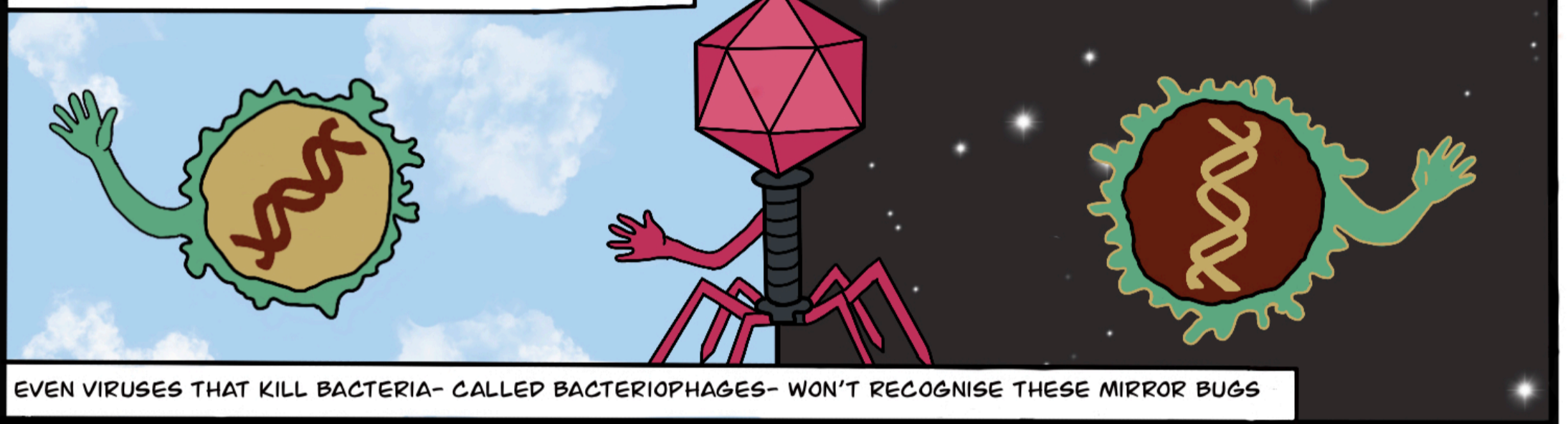
The scientist is a woman with dark hair, wearing a white lab coat and blue gloves. She is holding a test tube with yellow liquid. In the background, there is a computer monitor displaying a red DNA helix with a green cell membrane, a microscope, and a tray of test tubes. On the lab bench, there are several bottles and a petri dish.

AS MIRROR BACTERIA WOULD BE CONSTRUCTED FROM MIRROR BIO MOLECULES, THEY COULD POSSES SOME UNIQUE STRENGTHS, MAKING THEM SUPERBUGS.

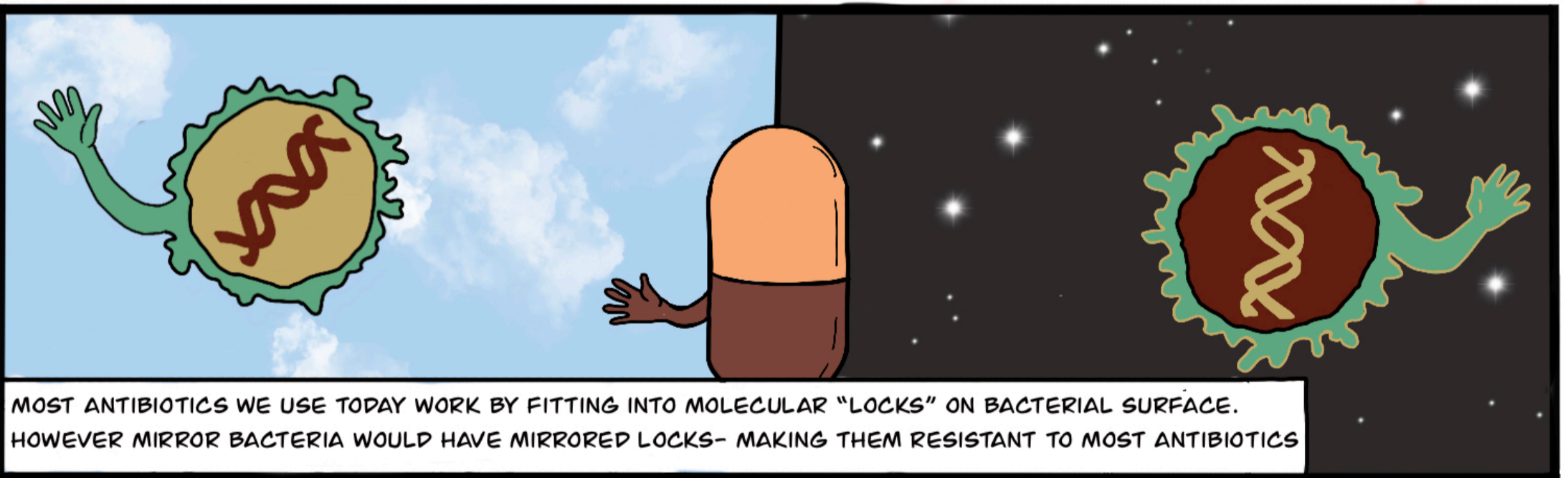


OUR IMMUNE SYSTEM CAN DETECT AND FIGHT MICROBES- BUT MIRROR MICROBES? IT MAY NOT BE ABLE TO EFFECTIVELY RESPOND.

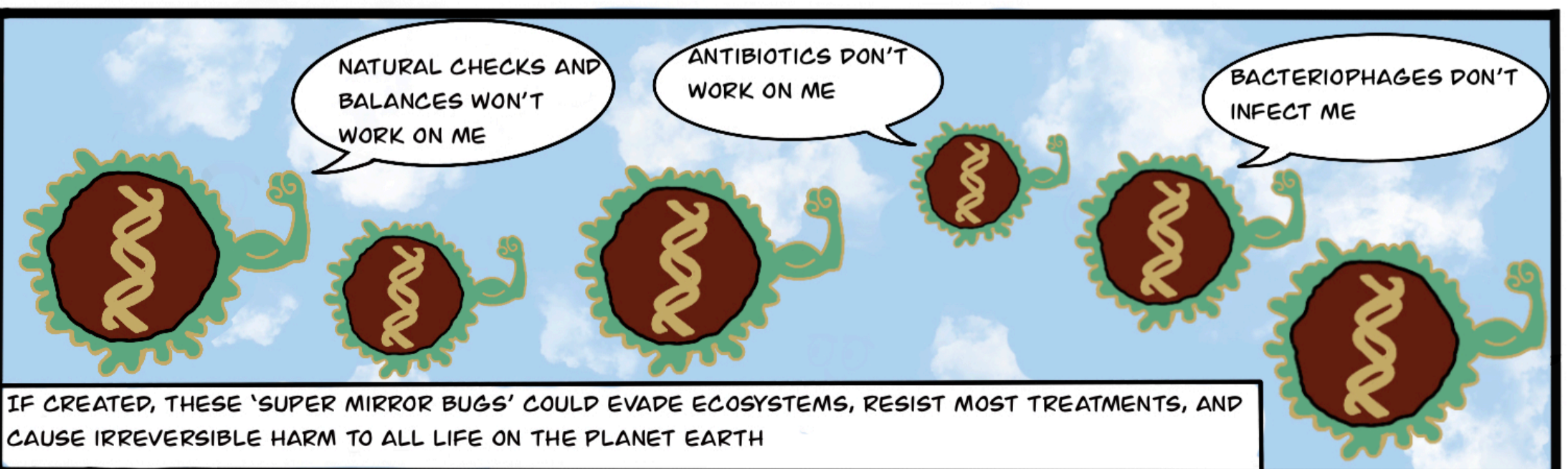
IN NATURE, BACTERIOPHAGES KEEP BACTERIA IN CHECK



EVEN VIRUSES THAT KILL BACTERIA- CALLED BACTERIOPHAGES- WON'T RECOGNISE THESE MIRROR BUGS



MOST ANTIBIOTICS WE USE TODAY WORK BY FITTING INTO MOLECULAR "LOCKS" ON BACTERIAL SURFACE. HOWEVER MIRROR BACTERIA WOULD HAVE MIRRORED LOCKS- MAKING THEM RESISTANT TO MOST ANTIBIOTICS



NATURAL CHECKS AND BALANCES WON'T WORK ON ME

ANTIBIOTICS DON'T WORK ON ME

BACTERIOPHAGES DON'T INFECT ME

IF CREATED, THESE 'SUPER MIRROR BUGS' COULD EVADE ECOSYSTEMS, RESIST MOST TREATMENTS, AND CAUSE IRREVERSIBLE HARM TO ALL LIFE ON THE PLANET EARTH

IN REAL WORLD, A MIRROR BACTERIA ESCAPING THE LAB MIGHT SPREAD QUIETLY, UNTREATABLE BY MANY OF TODAY'S DRUG, INVISIBLE TO PREDATORS AND IMMUNE DEFENDED - TURNING INTO A STUBBORN, UNCONTROLLABLE NEW INFECTION



IN 2024, 38 TOP SCIENTISTS- INCLUDING TWO NOBEL LAUREATES- SOUNDED THE ALARM. THEY WARNED THAT CREATING MIRROR LIFE COULD LEAD TO CATASTROPHIC RISKS, AND RECOMMENDED THAT THEY NOT BE CREATED BUT THAT THE USE OF MIRROR MOLECULES SHOULD CONTINUE

BEYOND SCIENTIFIC CURIOSITY, THERE'S NO CLEAR BENEFIT TO MAKING THEM

CREATING MIRROR LIFE COMES WITH SERIOUS RISKS....ARE WE READY TO HANDLE WHAT WE INVENT?

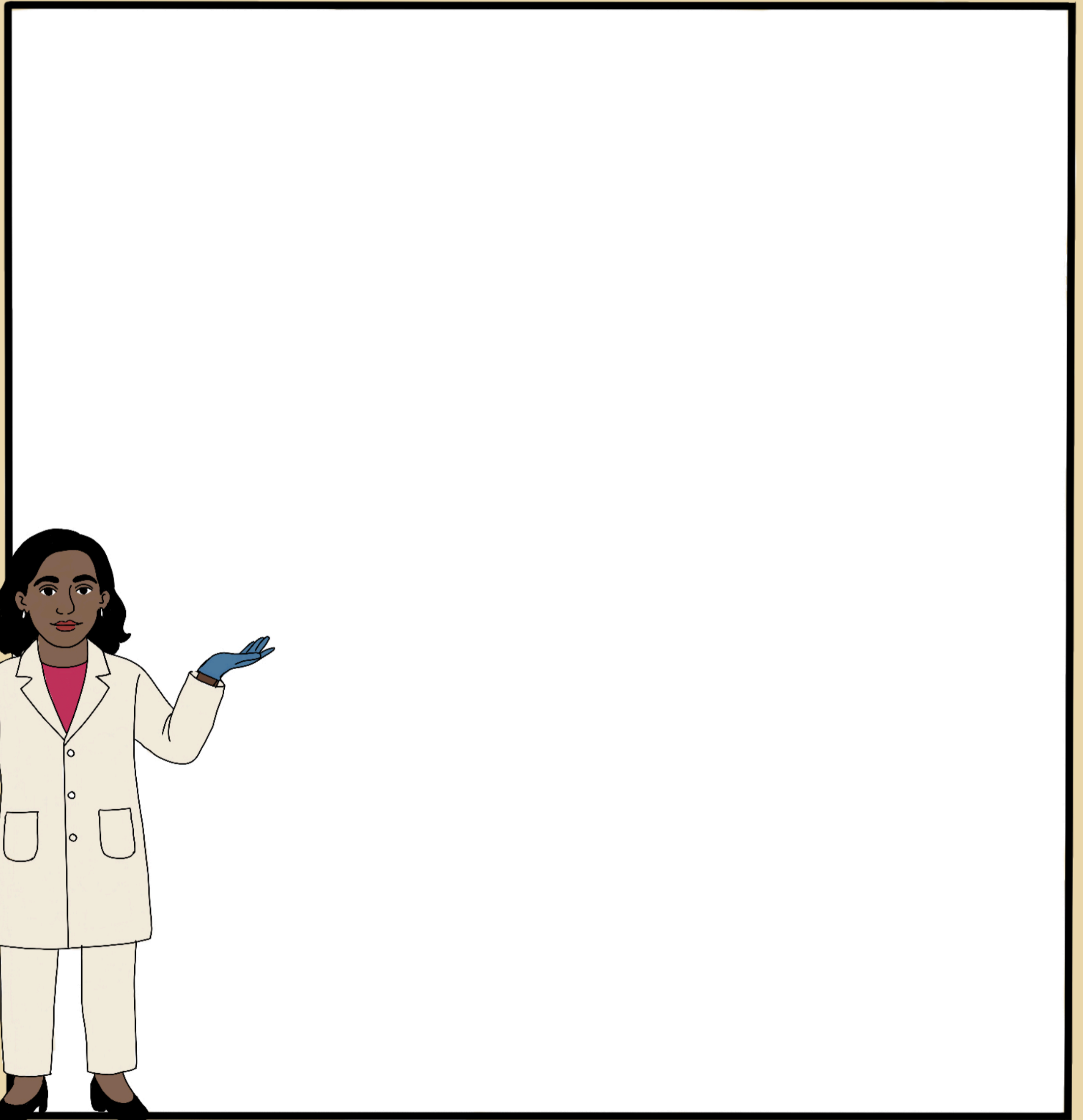
WHY? BECAUSE WE DON'T YET UNDERSTAND HOW THESE MIRROR MICROBES COULD IMPACT OUR ECOSYSTEMS



BAN RESEARCH ON
CREATING MIRROR
LIFE

SHARE YOUR REFLECTIONS

MIRROR BIOLOGY RAISES QUESTIONS THAT STRETCH BEYOND SCIENCE ALONE. HOW DO YOU IMAGINE THESE MIRROR ORGANISMS COULD SHAPE OUR FUTURE? WE INVITE YOU TO WRITE DOWN YOUR THOUGHTS, HOPES, AND CONCERNS AS PART OF THIS ONGOING CONVERSATION.

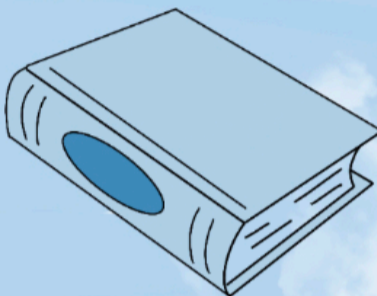
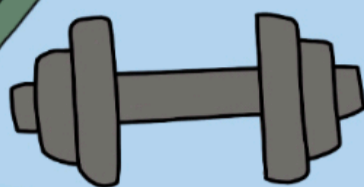
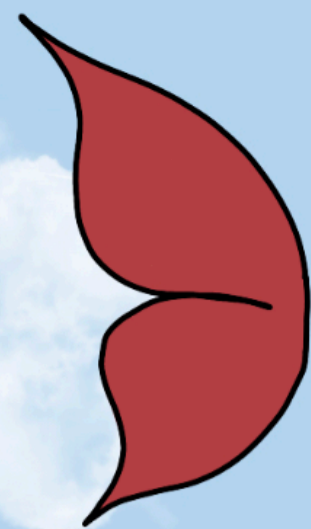
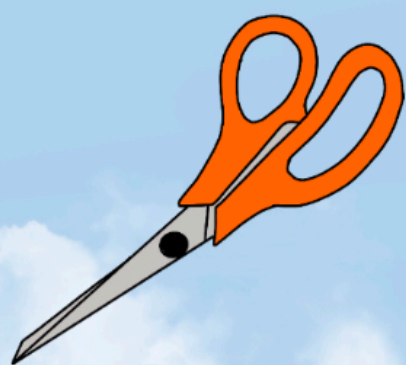


DISCLAIMER

THE CONTENT IN THIS COMIC IS INSPIRED BY THE 2024 ARTICLE "CONFRONTING RISKS OF MIRROR LIFE" BY AD ADAMALA ET AL. AND THE ASSOCIATED TECHNICAL REPORT. THE SUGGESTED RISK ASSESSMENTS ARE ANTICIPATORY, YET ROOTED IN KNOWLEDGE. BOTH THE ORIGINAL AUTHORS AND THE CREATORS OF THIS COMIC BOOK INVITE DIVERSE PERSPECTIVES, AS TOGETHER WE EXPLORE AND UNDERSTAND THE POTENTIAL IMPACTS OF MIRROR BIOLOGY

READ "CONFRONTING RISKS OF MIRROR BIOLOGY" [HERE](#).





FIND THE CHIRAL PAIRS

