

(MEDICAL BIOLOGY)

**SPECIFIC
ADAPTATION**

VARSHA DODAWAD

194 A

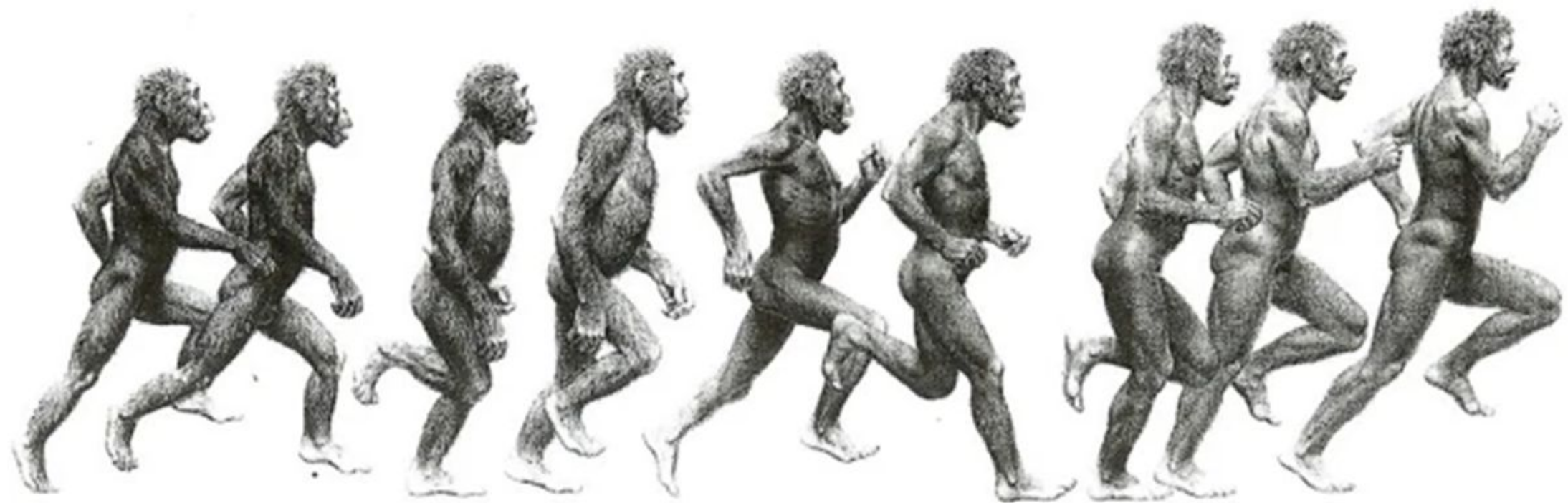
What is Adaptation?

The process which enables organisms to adjust to their environment in order to ensure survival.



INTRODUCTION

- **The three basic types of adaptations**, based on how the genetic changes are expressed, are structural, physiological and behavioral **adaptations**. Most organisms have combinations of all these **types**.
- What are some examples of adaptation?
- Structural **adaptations** are physical features of an organism like **the** bill on a bird or **the** fur on a bear. Other **adaptations** are behavioral. Behavioral **adaptations** are **the** things organisms do to survive. For **example**, bird calls and migration are behavioral **adaptations**.



A. afarensis

A. africanus

A. robustus

A. boisei


H. habilis

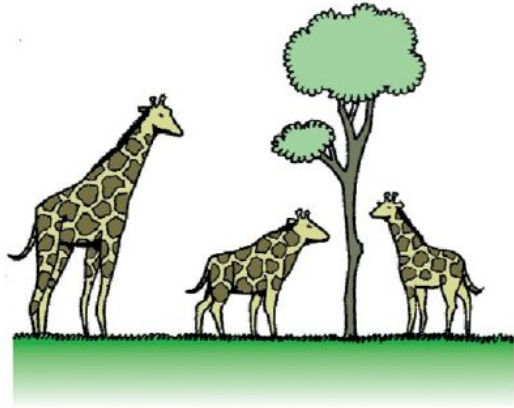
H. erectus

H. sapiens
(archaic)

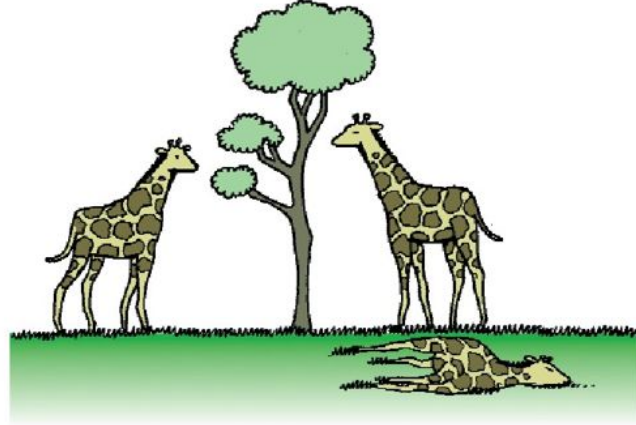
H. sapiens
(Neandertal)

H. sapiens
(modern)

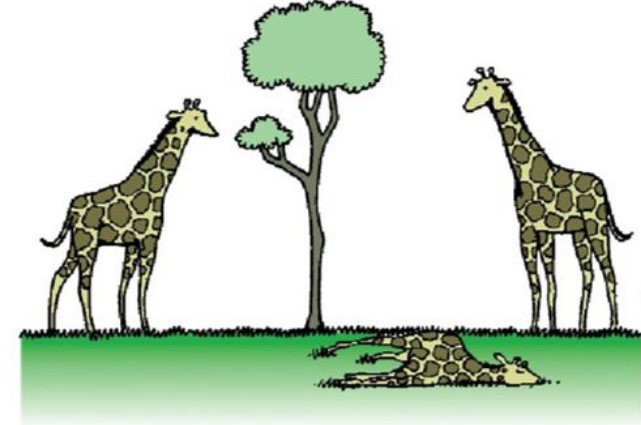
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- **Adaptation** Definition. “**Adaptation** is the physical or behavioural characteristic of an organism that helps an organism to survive better in the surrounding environment.” Living things are **adapted** to the habitat they live in. This is because they have special features that help them to survive.



Not all giraffes have equally long necks. Giraffes inherit their neck length from their parents. It is largely fixed by genes.



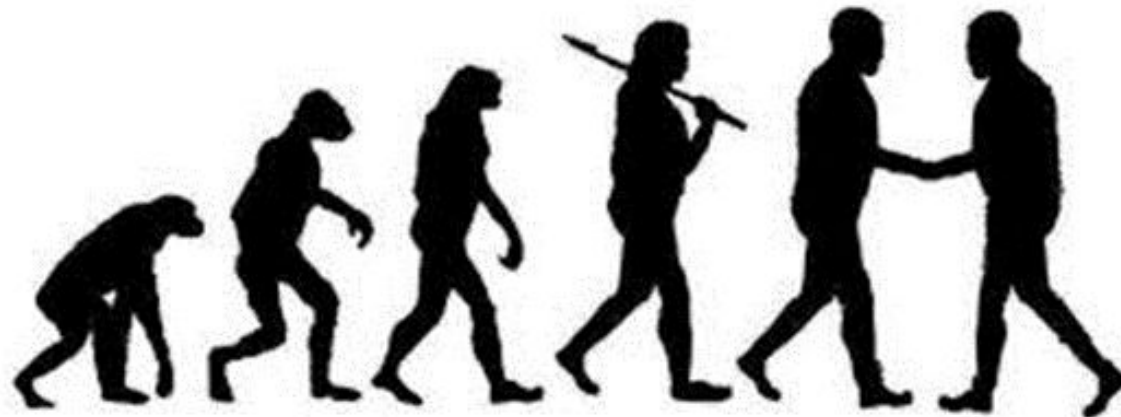
Food that are easily accessed will be eaten by many animal species, and is therefore easily gone. If this happens, giraffes with longer neck are more likely to survive. They can reach food that few other can reach.



Over time, more and more of the giraffes came to have long necks (the short ones never made it to reproduction). This is what we call natural selection and evolutionary adaptation.

SPECIFIC ADAPTATIONS

- What is adaptation ecology?
- All **adaptations** help organisms survive in their **ecological** niches.
... **Adaptation** is the evolutionary process whereby an organism becomes better able to live in its habitat or habitats.

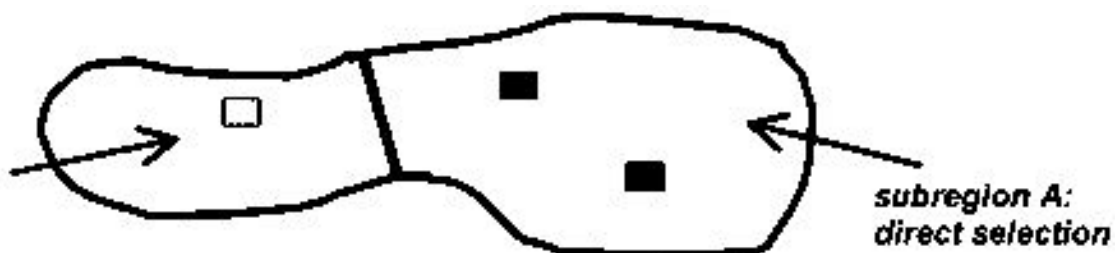


SPECIFIC ADAPTATION

- ADAPTATION IS A BIOLOGICAL MECHANISM BY WHICH ORGANISMS ADJUST TO NEW ENVIRONMENTS OR TO THE CHANGES IN CURRENT ENVIRONMENT
- IN EVOLUTIONARY THEORY, THE IDEA OF NATURAL SELECTION IS THAT TRAITS THAT CAN BE PASSED DOWN ALLOW ORGANISMS TO ADAPT TO THE ENVIRONMENT BETTER THAN OTHER ORGANISMS OF SAME SPECIES

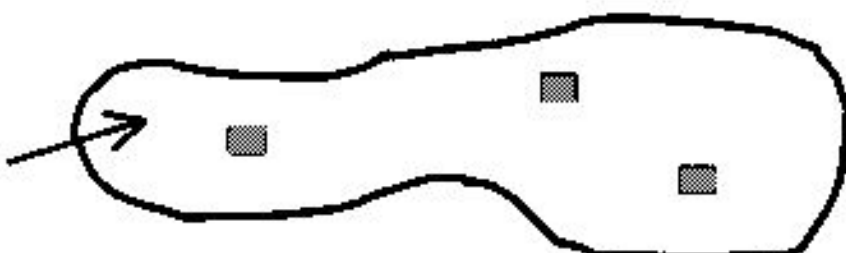
Specific adaptation

*subregion B:
direct selection*



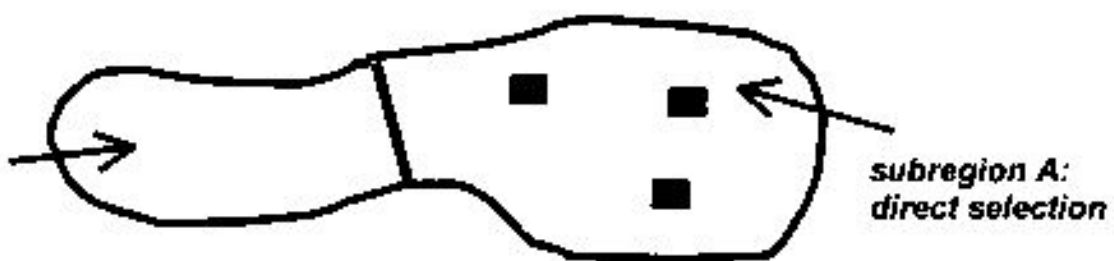
Wide adaptation

*whole region:
direct selection*



Specific adaptation to one subregion

*subregion B:
indirect selection
from A*

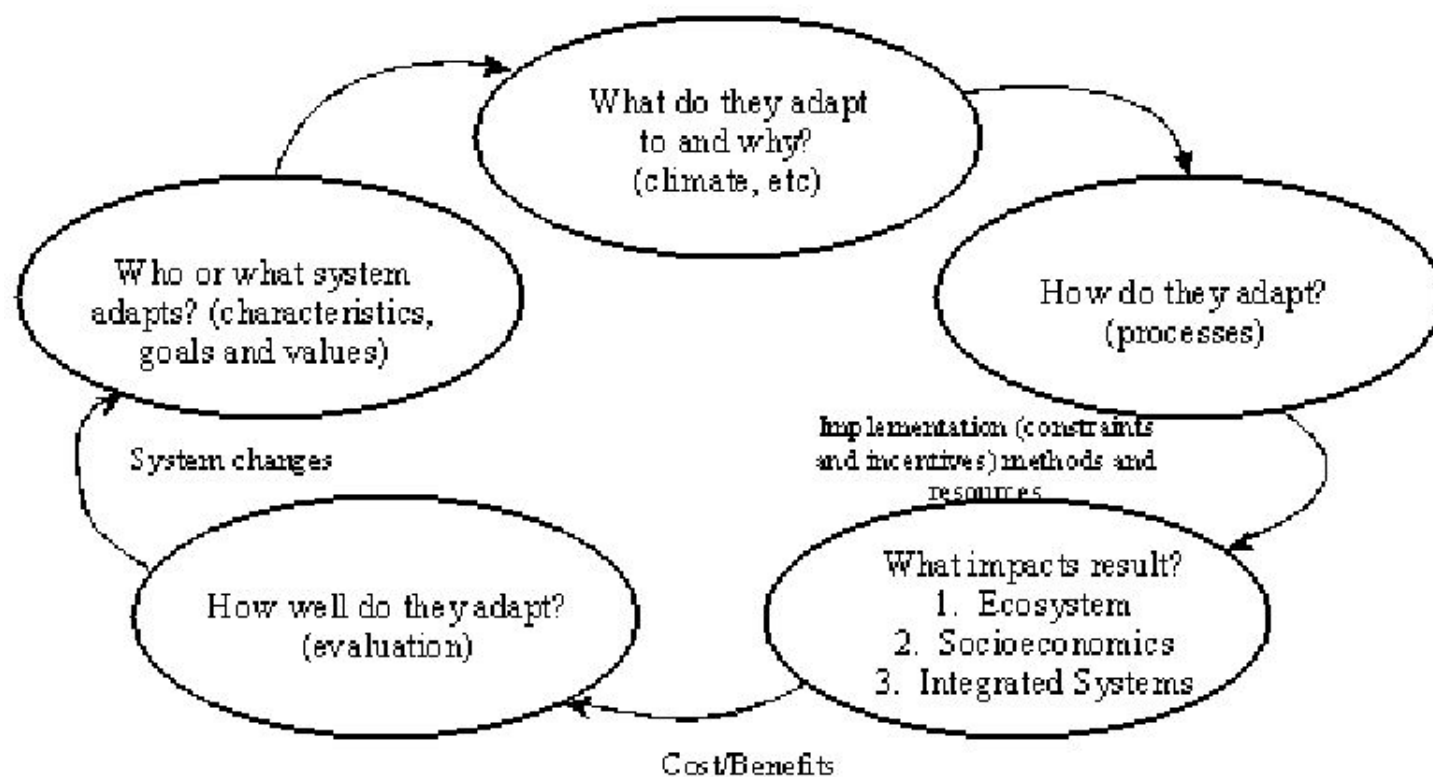


SPECIFIC ADAPTATION

- An **adaptation** is a characteristic of an organism that improves **its** chances of surviving and/or reproducing. ... There are three different **types** of **adaptations**: Behavioural - responses made by an organism that help it to survive/reproduce. Physiological - a body process that helps an organism to survive/reproduce.

ADAPTATION CYCLE

(through space and time)

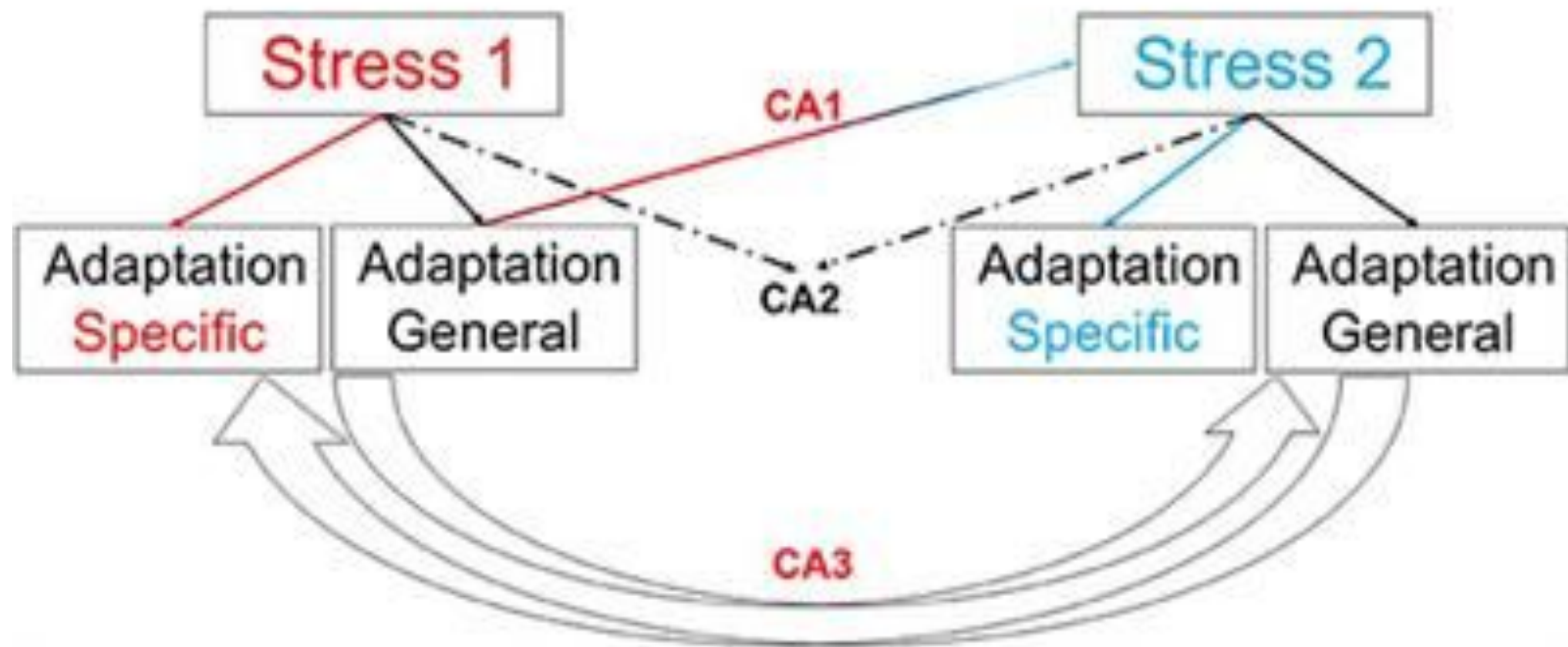


SPECIFIC ADAPTATION

- ***EXAMPLE:***

- THE DOMINANT HAND OF A TENNIS PLAYER WILL HAVE LARGER BONES THAN OPPOSITE
- MARTIAL ARTISTS CAN TOUGHEN THEIR SHINS AND FOREARMS INTO STEEL WEAPONS THROUGH REPEATED SHOCK TREATMENT OF BONES
- PLACE OF HEEL BONE WHERE IT STRIKES THE GROUND, WILL BE VERY HARD AND DENSE

Cross-Adaptation



What Makes This Adaptive Response Specific?

- The general adaptive response is what occurs to the body when pretty much any system is stressed, hence the term “general adaptation”. Thus, this is the same process that makes you tan, the same process that builds callouses, and the same process that builds muscles.
- The body is not very good at understanding specificity.

THANK YOU

GUIDED BY -

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