

### RELATIVE SIZE OF CEREBRAL CORTEX (Chapter 20)

- Difference in brain size associated with cerebrum
- Outer cerebrum, cerebral cortex, shows greatest development in human
- Human larger brain size = large brain case/cranium
  - ∴ Brow ridge tends to be vertical and less prominent
- Less prominent brow ridge and shortening of snout = human has flatter face (though nose bone is still protruding)
- An evolutionary trend in hominins

### PROGNATHISM & DENTITION (Chapter 20)

- Compared to other primate, human dentition = very distinctive
- Human's canine are align with other teeth and look more like incisors
- Small canine and incisors = less space in jaw
  - ∴ Tooth row, dental arcade, evolve into parabolic shape instead of "U" shaped
- Decrease in canine size = no need for diastema
  - Diastema allow closing of jaw with large canines
- Molar and premolar become smaller due to change in diet
  - Where diet consist of softer food including meat, then cooked food
- Gradual loss of wisdom teeth (2<sup>nd</sup> molar)
- Apes and early hominins have forward jutting jaw
  - Change in jaw known as prognathism
- Gradual reduction in teeth size = flatter face, development of chin, prominent nose

### EFFECT OF ENVIRONMENT ON HOMONIN EVOLUTION

- Hominins thought to have lived on woodlands or forest environment
  - Early hominins were aped like with features suited for arboreal
  - Gap in forest canopy = need to travel on open ground
    - ∴ Turned bipedal as natural selection favoured bipedal walking ape
- Benefits of bipedal locomotion
  - Increase range of vision to spot prey and predators at a distance
  - Increase size, intimidating predators
  - Hands free to carry more food and offspring, and allow tool use
  - Higher reach when picking fruits from trees
  - Improved cooling of body
    - With less surface areas exposed to sun
    - Upper body is above ground to have more wind

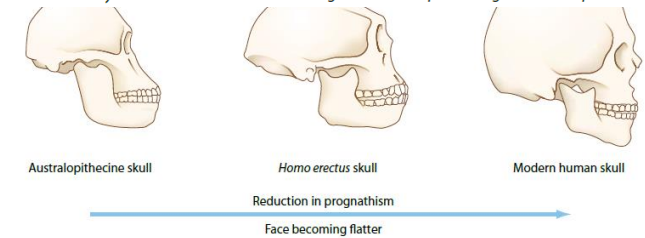
#### Early Homo

- Were hunter gathers and brought food back to base
  - Relied mainly on plants and occasionally meat
  - Adult males: hunted
  - Adult females: gathered plant materials
  - Young left at safety of home base
- Increase of brain size from consumption of high energy dense food, from meat
  - Meat isn't simply gathered
  - Meat is caught and killed, or stolen from predators, not simply gathered like plant food
    - Therefore, requiring development of reasoning and cunning power
- Food gathered or hunted would be shared, which develop group to be more close knitted
  - Building social and economic function unit leading to development of spoken language
    - There was increase in speech production area of brain
    - But, larynx not yet capable of making complex sounds

Table 19.2 Hominin cranial capacities

| Hominin                           | Cranial capacity (cm <sup>3</sup> )<br>(an estimate of brain size) |
|-----------------------------------|--------------------------------------------------------------------|
| <i>Australopithecus afarensis</i> | 430                                                                |
| <i>Australopithecus africanus</i> | 457                                                                |
| <i>Australopithecus garhi</i>     | 450                                                                |
| <i>Paranthropus boisei</i> *      | 491                                                                |
| <i>Paranthropus robustus</i> *    | 542                                                                |
| <i>Homo habilis</i>               | 590                                                                |
| <i>Homo rudolfensis</i>           | 774                                                                |
| <i>Homo ergaster</i>              | 800                                                                |
| <i>Homo erectus</i>               | 1004                                                               |
| <i>Homo heidelbergensis</i>       | 1226                                                               |
| <i>Homo neanderthalensis</i>      | 1485                                                               |
| <i>Homo sapiens</i>               | 1350                                                               |

\*Note: Many classification schemes include the genus *Paranthropus* in the genus *Australopithecus*.



### CULTURAL EVOLUTION IN HOMININS