

Transcript

11-Chromosomes

A few introductory words of explanation about this transcript.

This transcript includes the words sent to the narrator for inclusion in the latest version of the associated video. Occasionally, the narrator changes a few words on the fly in order to improve the flow. It is written in a manner that suggests to the narrator where emphasis and pauses might go, so it is not intended to be grammatically correct.

The Scene numbers are left in this transcript although they are not necessarily observable by watching the video.

There will also be occasional passages in blue that are NOT in the video but that might be useful corollary information.

There may be occasional figures that suggest what might be on the screen at that time.

155. Cell

Let's take a fantastic voyage into the nucleus of one of your cells in search of your chromosomes. As we penetrate the outer cell wall, we find ourselves swimming in a viscous material called cytoplasm and in addition to the nucleus floating in the cytoplasm, we encounter other tiny parts of the cell. We pass ribosomes and lysosomes and golgi and mitochondria on our travel.

But our destination is still ahead – the very heart of the cell. This is the nucleus. Penetrating the nucleus wall, we encounter 23 pairs of DNA molecules. These are your chromosomes. You have 46 chromosomes and they come in pairs. One chromosome of each pair came from your mother and the other came from your father.

157. Chromosome Count

Other creatures have many different numbers of chromosomes even though we share many of the same genes. For example...

The field horsetail plant has	216
And the crayfish has	200
A dog has	78
Humans have	46
Mice have	40
A fruit fly has	8

A house fly has 12

And a tiny ant has only 2.

AS you can see, the number of chromosomes is not an indication of how complex the organism may be.

And while we have different numbers of chromosomes, the total content of those chromosomes is often startlingly identical.

For example, this infant and this mouse have a mutation in the same gene, which results in similar white patches on the stomach and forehead.

160. Chromosomes

JEEVES:

Each of your chromosomes is a single continuous strand of DNA – one enormous molecule. And as that molecule winds or unwinds, each chromosome can vary in shape from a stringy, open formation if it is performing a task to a remarkably tightly packed mass if the cell is preparing to subdivide.

(This winding is so efficient that it packs 3 feet of DNA helix into a cell nucleus...The helix is 3.4 angstroms per step)

This particular clump of DNA is chromosome 17 magnified some 50,000 times. And as we zoom in, you can begin to make out the rungs on the ladder. Each of these rungs is just one of the 3 billion letters that make up the book of our instruction manual.

197. GovWebSite

JEEVES:

The US Government maintains a web site with much of the current information about genes, chromosomes and proteins.

In the section labeled “Chromosome Viewer,” you can select a chromosome and see how many base-pairs or letters are on that chromosome.

When you get to the web page for each particular chromosome, you can see a list of traits and disorders associated with genes on that chromosome.

Let’s enlarge chromosome 7 and look at one gene thereon. As you can see the gene that causes Cystic Fibrosis is here.

On other pages you can see genetic disease PROFILES ... here is the Cystic Fibrosis profile.

You can even examine specifics about some genes. Many genes and their location on each chromosome are listed.

