The strange case of Oliver the Chimpanzee

Consider the genetic diversity of Chimpanzees and Bonobos, our nearest relatives. The total population of these animals is small compared to humans, but their genetic diversity is much larger than that of our species. In fact, all 7 billion humans have a very limited level of genetic diversity; merely on the order of a somewhat large chimpanzee population.

Genetically, humans appear to be an inbred subset of the chimpanzee species. Remember that, as we read further.

Oliver was an unusual chimpanzee captured in Africa.

Some physical and behavioural evidence led his owners to believe Oliver was perhaps a human-chimp hybrid: Oliver possesses a flatter face than his fellow chimpanzees; his ears and jaw line were shaped a bit differently than the normal chimps, Oliver was habitually bipedal (before being struck with arthritis), never walking on his knuckles like his chimpanzee peers; powerful shoulders straight and broad, arms swinging at his sides – instead of hunched forward and using his hands and arms, like most chimps and far less hairy. He also had a softer and quieter bird-like voice.

Oliver's behaviour was also most unusual! He seemed to have a much higher IQ. Oliver was calmer and more human-like (in an infantile sort of way) than other chimps and would even volunteer to do chores (very un-chimp-like). Not only was Oliver rejected by other chimps; Oliver also rejected the company of other Chimps, preferring instead the company of humans.

A geneticist from the University of Chicago examined Oliver's chromosomes and determined that Oliver had forty-eight, not forty-seven, chromosomes. Oliver also had a unusual mitochondrial DNA sequence indicating he could represent a unique population of Chimpanzees never encountered before. (for more on Oliver: click on LINK 1 LINK 2)

Questions:

Why would anyone suggest that Oliver had 47 chromosomes when Chimpanzees have 48?

_____
_____
_____

Explain why the idea of human-chimpanzee hybrids is not outrageous from a scientific point of view. Cite other examples to support your explanation: _____
_____
_____

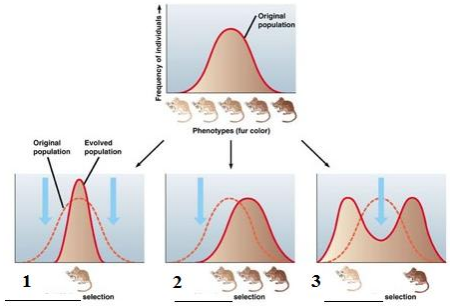
Some scientists suggest Oliver represents a sub-species. What evidence supports this contention?

_____
_____
_____
_____

Based on some reading we did earlier in the year, could Oliver represent a single mutation event in one gene? Can you suggest any experiment to address this question?

_____
_____
_____
_____

Let's review some evolution theory on polygenic theory.
What of natural selection is occurring in each of the 3 scenarios below?



1 _____ selection

2 _____ selection

3 _____ _____ selection

The trait shown above is NOT "simple-Mendelian", but rather polygenic. So what does "polygenic" mean and why do the three examples of natural Selection shown above demonstrate polygenic inheritance?

Polygenic – definition: _____
_____
Why Polygenic demonstrated in graphs above _____
_____

Let's assume that Oliver represents a unique mutation event (except for his immediate family).
Define "Pleiotropy" and then explain how Oliver would demonstrate "pleiotropy".

Pleiotropy definition: _____
_____
As demonstrated by Oliver: _____
_____

Given Oliver obviously cannot interbred with other chimps – does he represent an evolutionary "dead-end"?
_____
_____
_____ _____

Again, let's assume that Oliver is a unique mutation event. If presented with Oliver, would Darwin have been surprised according to how Darwin suppositions of how evolution was supposed to proceed? How about Niles Eldredge and Stephen Jay Gould, how would they have reacted? Explain:

Darwin: _____
_____
_____ _____
Niles Eldredge and Stephen Jay Gould_____
_____
_____

What do you think? Is Oliver a representative of a new sub-species, or some peculiar Chimpanzee population or a unique mutant?_____
_____
_____
_____
_____
_____