What is the gene definition now and what is next?

Sir,

The year 1953 was an annus mirabilis for science due to discovery of DNA molecular structure, and its genetic implication, chemical nature and molecular configuration. Since 1953, a new era of molecular biology started with an aim to understand the blue print of life, and then a deeper dissection/mining of human genome started. Various mega projects arises to resolve the hidden mystery of genome such as vast Human Genome project, Single Nucleotide Polymorphism (SNP) project, Haplotype mapping (HapMap), 1000 genome project and now the Encyclopedia of DNA Elements (ENCODE). All these projects explained the genome slice by slice and shed light on innumerable untouched molecular biology. It also expands our view about the gene and its function and a hierarchical organization inside the nucleus.

Recent issue of Nature (Vol. 489, 6 Sep 2012) has now released The ENCODE project with a gigantic multiyear, multinational study that challenges how we think about a gene and its function in a cell.[1] The vastness of the project involves a total of 32 institutions, around 442 members in five different countries.[2] Now from the ENCODE project it is clear that a three-quarters of our genome is capable to transcribe into RNA message (transcription), and a big chunk of non-coding RNA harbors many disease-causing mutations. These facts add more complexity in dissection of complex human diseases including more heterogeneous disease such as cancer. The ENCODE data in one hand reveals the hidden intricacy of the genome, power of consortium, strength of co-operation, digital power of computer, and on the other hand opens plethora of questions about the genes and its function.

Moreover, besides many open questions, one important question is: How do we define the gene now? Will the ENCODE project shift our view about the gene definition or still more complexity is hidden in the nuclear chest or may be in the near future we will be able to dissect the more slices of our genome? Interestingly, the Encode project opens many new doors for genomic research. However, I strongly believe that this is now the time for large collaborative research initiatives and collective efforts towards big goal especially in the field of genomics, pharmacogenomics and genetics. Such models of larger experimental design and huge collaboration can be applied in other fields of scientific research.

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