The cloning bandwagon

Current discussion on the ethical consequences of genetic research is misplaced, write Manu Kothari **and Lopa** Mehta

Thanks to Keith Campbell (1), Dolly the wonder sheep has arrived in Scotland, at the modest price of $750,000. Mankind has been thus dragged yet nearer to the Huxleyean Brave New World. To an already contentious, consumeristic and cruel world, the spectre of manufacturing Hitlers and Huns on a clonal scale is frightening. No wonder discerning journals - to wit, the July-Sept 1997 Issues *in Medical Ethics* - are full of debates on the ethicality of new genetic discoveries and applications thereof. The ethical bandwagon would make more sense if the geneticists and ethicists were to bear in mind some fundamental principles that govern the field of genetics. This done, our expectations - social, medical, financial - from genetic adventurism would be trimmed to size, and our fears from genetic misadventurism would be pruned as well.

Set below are some incontrovertible data that could guide our genetic *weltanschauung* in the coming decades.

■ The decisive cell in the making of Dolly was not the mammary cell that loaned the nucleus, but the cytoplasm of the ovum that played host to the nucleus. This has remained the rule (2) from the time Gurdon (3) transplanted a somatic nucleus from an intestinal cell to the enucleate cytoplasm of toad zygote. Subsequent experiments involving nuclear swapping even among somatic cells has shown that the cytoplasm calls the tune (4), the nucleus merely follows it.

■ Dolly's avowed refusal to be called a member of a clone or to be cloned lies in the individuality or uniqueness of the ovum that spawned Dolly and the individualistic ova that Dolly will carry in her ovaries. Nature, in its inscrutable wisdom, insists on the Darwinian 'descent with variation'. Towards this end it sees to the fact that neither the parental virtues nor the vices are foisted on the progeny. To achieve this, it has the gametogenic process of meiosis (5), in which reduction and crossing over provide gametes (ova/sperms) not one of which is identical to the other in the very same testis or ovary. Hence the Dolly that is extant and the Dollys that will be begotten will never, can never belong to a clone, for the fundamental ovum from which each of them comes is invariably variable, individualistic, unprecedented, unparalleled, unrepeatable; in short, unique. All that Dolly-making. has shown is that the ovular/zygotic cytoplasm can make do with a somatic nucleus. Good as news; wrong as clonal news.

■ The genetic *idee fixe (6)* that homozygous human twins share a common genotype is belied by the fact that such twins are more discordant than cordant. Even Siamese twins, united in flesh and blood, have dissimilar finger prints. The exchangeability of tissues amongst twins is a function of their sharing a placenta *in utero:* even if the twins are dizygous but monoplacental, they can exchange tissues; but if they are monozygous and yet if they do not share a placenta (one-third of pairs do not) than they reject each other's tissues as avidly as unrelated individuals (6)

■ Montaigne intuitively aphorised that "There never were in the world two opinions alike, no more than two hairs or two grains; the most universal quality is diversity." This generalisation of the early part of this century has been confirmed with devastating effect towards its close.Apendulum moving in two planes never exhibits the same orbit: "Each swing of this chaotic oscillator is unique. The system never repeats itself, so that each cycle covers a new region of phase space." (7)

Chaos (8) is a buzzword of today. It is modern science's euphemism for its incurable ignorance vis-a-vis any cell, animal, person or event. Science knows that each of the foregoing will be assertively unique, but science can never predict what exactly it would be. Science is wiser about the uniqueness only after the event is a *fait accompli.* How and why?

■ It is time to synthesise modern science and Vedic wisdom.

No two LTIs - Left Thumb Impressions - have been the same. Each LTI, when in the making *in utero,* is asked to be, in the telling words of Rene Dubos, unprecedented, unparalleled, and unrepeatable. This comes to pass because of the TITE principle which reads: Total Inclusion allows Total Exclusion. Any LTI first knows - includes as it were - all the LTIs that were, are, or will be. Having so included them, it is also to effectively exclude them. So for the uniqueness of atom, gene, DNA pattern, cell, cancer cell, human gyri and sulci of the cerebral hemispheres, venous pattern on dorsum of foot and so on. Every manifest phenomenon, as it were, gets guided by the cosmic noumenon.

Vedanta has it that whatsoever is is, Isvar or God who is described as *ekam evam, advityam, nit-yam* - one and only one,, without a second, and eternal. Each of the orbit executed by the pendulum described above manifests all the qualities listed for Isvar. The *nityam* or eternal part is simple to understand. The LTI of Christ is eternal in the sense that it guided all human beings, that preceded Him, were contemporary to Him, and have followed Him.

Science and Vedas thus allow us a sweeping generalisation: No matter how closely clonish are things/cells/beings produced by human ingenuity, the Cosmos will see to it that each one of them will be different from the other. The Brave New World will remain re- ed that Huxley wrote.

■ The TITE principle could be reinforced a little differently. Wolfgang Pauli won a Nobel prize for the Pauli Exclusion Principle (PEP) that declared that no two fermions (read, any elementary particle) can be in identical quantum states. "Thus no two electrons in an atom can be identical in all their quantum numbers."(9) An electron is a particle/mass/event that being Is-var assumes uniqueness. So does any other phenomenon. Hence the revised reading of PEP - Phenomenal Exclusion Principle. No two phenomena can ever be identical. If uniqueness prevails at an elementary level, what to talk of Dollys and humans. Let us breathe a sigh of relief that Genghis Khans will not be duplicated, much less cloned. Let us be reassured that even if there were, like Ravana, a Siamese twin with (10) heads, all the ten heads will have dissimilar gyral-sulcal pattern as also distinctive lip-prints.

Proponents of positive eugenics may argue that entire genetic advances may allow us, one day, to make a genius or a great man by order. But it needs to be understood that if a farmer's wife can beget Spinoza and a grocer's wife can spawn Gandhi, why should we hanker for a lab-manufactured superman?

■ Modern science, with regard to the medical field has remained awfully long on promises and lamentably short on performance. It has pretended to research on all major diseases - coronary artery disease, stroke, cancer, hypertension, diabetes mellitus, arthritis - for none of which has if any precise, workable definition. No wonder that about the cause, course, and the cure of each of these it has drawn a blank (10,11). All the aforesaid maladies have remained not only trans-science but transtechnique as well (12,13).

The spinelessness of definitionlessness equally plagues the field of genetics, Genes, genetics and heredity, in texts large and small go abegging for definition. The most advanced texts and articles are replete with apologetic terms that explain away problem by buts, howevers, althoughs and ifs. Many a hypothesis in medicine smacks of a truth that cannot be verified nor a lie that can be nailed. The current obsession about oncogenes is guided more by market forces than any science: "Francis Collins of the US National Institutes of Health, and director of the Human Genome Project, says the effort to market the genetic tests is alarming, entering territory that is still research and should not yet be commercialised. Ethicists and cancer specialists say that it is currently premature to test adults and children and label them cancer-prone when we are not at the stage of being able to do much about it."(14) As a review(15) of an American book on AIDS reveals, "truth becomes a casualty of competing interests : commercial, political and scientific," a patheticplay from which such luminaries as Robert Gallo, Jonas Salk and Henry Heinlich are not exempt. Dolly has made Wall Street busy with calls for investors who see a future in human and animal organs (1). The ploy is scare-mongering, promise-mongering, dollar-spinning. Hippocrates, Osler, Susruta and Charaka are turning in their graves.

■ The much-vaunted and much-costly HUGO (16) - Human Genome Organization - project promises to map all the 50,000 to 100,000 genes that makes the human genotype. The abysmal disparity between the gene number that each of us have and the million-fold work that each gene would have to do makes it clear to us that the geneticists have been demanding too much out of a single, as-yet-undefined, human gene.

"The human genome (the sum total of the genes in our chromosomes) does not specify the entire structure of the brain. There are not enough genes available to determine the precise structure and place of everything in our organisms, least of all in the brain, where billions of neurons form their synaptic contacts. The disproportion is not subtle: we probably carry about 50,000 - 1'00,000 genes, but we have more than a trillion synapses in our brains."(17) Each human being co[illegible]0),(billion cells which are in far excess of the approximately 3,000,000,000 base pairs that constitute the 100,000 genes. This takes us straight to the conclusion that any single gene must control a myriad of cells and processes. So the gene that supposedly controls/decontrols cancer must, of necessity control 1,000 other things in the body. In the name of preventing/treating cancer you tamper with particular gene , and invite in the bargain l,OOO-fold disturbances. Let it be understood that the HUGO project is not going to provide geneticists a tinkerers' paradise.

Most common human afflictions are governed by polygenic or multifactorial inheritance (16,1 S), which is another way of saying that it is not the genes of an individual that decide the presence or absence, staticness or progress of a disease, but the abstract relationship that the individual bears to the whole herd. It is ***herdity*** at work, and not ***heredity***. Frazer Roberts (18) is quite candid about the genetic basis of disease : "A single gene is certainly the simplest and most economical hypothesis; but it is the least likely."

With due respect to the HUGO project, and a 12 million dollar gift (19) to it by billionaire William Gates III of Microsoft fame, it must be concluded that the gene-hunt for discovering the basis of the cause and the cure of diseases is like the search for the Holy Grail. It surely amounts to asking a blind man to go into a dark room to find a black hat which is not there.

■ Genetic science, like all other sciences, rests on experiments. It is significant that the terms experience, experiment, experimental, expert, expertise are rooted in Latin ***experientia*** from ***experiri*** meaning try, trial, observation, peril, and more importantly, fear. (An expert, by etymology, is most fearful and fearsome.) Experimental science, then, is observational exercise depending on what the senses of the experiencer perceives. And here, indeed, lies the rub.

The lay and the learned are subject to APDOR : Anthropo Psychic Distortion

Of Reality. A good 500 years after Copernicus, we are still stuck with sunset and sunrise, for try as we may, the earth seems stationary and the sun revolving. On a moonlit night with clouds around, it is the moon which seems to move and hide behind the clouds. We say 'we take breath', when in reality it is not something we can take, for the active role is played by the air rushing in under its positive pressure. The healthy do not necessarily survive, the diseased do not necessarily die - death and disease are not related, the former being a function of time, the latter a function of the body. Yet the institution of the cause of death thrives. Smithers (20) declared long ago that there is nothing like a cancer cell, and yet the Himalayan edifice of cancer research has been built on the keystone that is missing. Sir Wilfred Trotter was amused by the mysterious viability of the false, a state we all can merrily share. Heisenberg, the father of the Uncertainty Principle, summed it up pithily : The very act of observation alters its reality.

Like the temporal second, minute, hours and year which in reality exist not, so may be the case with what passes as gene. It is time to revise our thinking : The gene is a point of convergence of cosmic *noumenon* from which it receives orders. The gene is operative but not decisive. What the gene or genes would be is predetermined before the gene or the genes come into being. As the TITE principle renders it clear, the uniqueness of a person precedes, accompanies and outlives the person. Hence the person's genetic constitution, DNA fingerprints, chromosomal constitution are predetermined by cosmic forces well beyond the nose of the geneticist. Gene/genes/chromosomes/genome are resultant events that take orders to merely execute them. With regard to the never-fulfilled promise of gene-therapy of this disease or that, the geneticists are surely tilting quixotically at windmills.

■ Smithers (20) of England, and Nobelist Burnet(21) of Australia have lamented the amazing lack of "biological scholarship" that permeates the lives and works of medical practitioners and researchers. "For it is necessary to insist upon this extraordinary but undeniable fact : experimental science has progressed thanks in great part to the work of men astoundingly mediocre, and even less than mediocre."(22) In continuity with this sweeping generalization by Ortega Y Gasset, read Eysenck : "Scientists, especially when they leave the particular field in which they have specialised, are just as ordinary, pig-headed and unreasonable as anybody else, and their unusually high intelligence only makes their prejudices all the more dangerous.. ."(23)

■ Watson(24) of ***Double Helix*** fame, described cancer research as "scientifically bankrupt, therapeutically ineffective, and wasteful.'?' The same words could be used for the whole field of gene, genetics and heredity in its attempts to alter the cause, course and cure of human suffering.

The essential burden of this essay is to make explicit the built-in impotency of the whole science of genetics and cloning, and to put our minds to rest vis-a-vis the ethical issues arising therefrom. The oft-raised discussions on ethical issues give to genetic research the importance and attention that it inherently does not deserve. Till we realise that, ethical discussions will remain a good intellectual pastime, adequate filler-material for lay and learned publications, and enough excuse for international safaris and conferences.

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