

# Farm house or Pharma house

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**M**an acquired the skill of domestication even before he acquired the skill of agriculture. He started keeping animals for friendship, then for food, and fibre(wool). Organised and large-scale farming made the keeping of animals for financial consideration. The end of the 20th century is witnessing a quantum jump adding a fifth 'F' for animal keeping as factory machines.

Biotechnology has brought in a sea change in farming, by way of improved seeds and plants which paved way to transgenic plants. Transgenic plants or animals are those living things, to which a gene from some other source has been added. Typical example is a microbe to which a human gene, which is capable of producing insulin is added. Now this type of insulin is available which is more effective and without any side effects like cattle insulin or pig insulin which we were using. Also many plants were made with additional nutritional property(Soya), better keeping quality (tomato) and disease and weedicide resistant plants etc.

First transgenic large animal was a goat named Tracy and she could produce milk with a medicinal property. Now scientists have made transgenic pigs whose tissues are compatible to man. Biologically pigs are more akin to man for transplantation or is it other way round. Times are not far off, that you may go to a pig farm either for a clean liver for transplantation or for a kilo of port. Hope we will not get transplanted with a pig head. Another problem of the pig organ transplants will be that they will get afflicted by diseases that are exclusive to pigs. Plants compared to animals have an advantage of vegetative

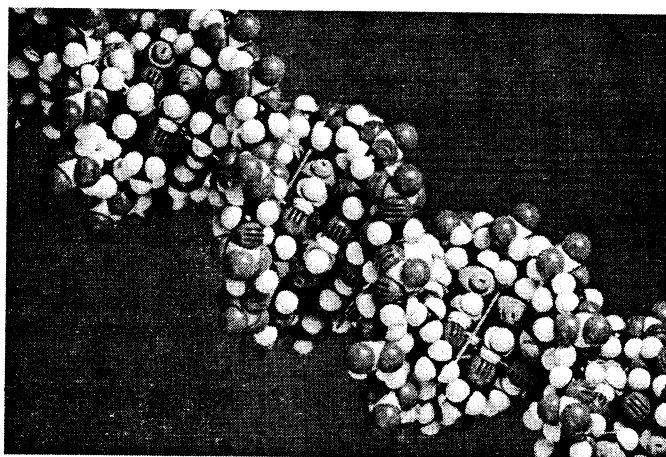
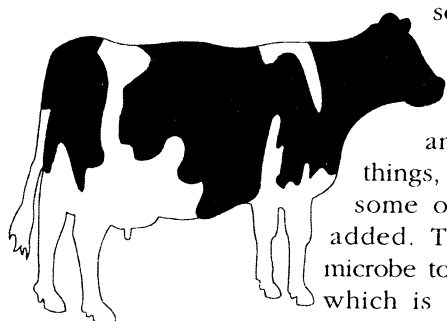
propagation like getting the progeny by cutting as in the case of tapioca. But that is no possible in animals.

This has led to the technique of cloning. By this we get the exact replica and not the mirror image (in mirror image there is shift of the side) The Progeny will not be the chip of the old block but will be of the same block.

The first cloned calves George and Charlie give us the hope that customised animals can, not only be produced but reproduced also and can have medicines for humans in their milk. Though the first cloned calves were males, the real pay off will begin with females, becoming living pharmaceutical factories.

The scientists are planning to produce cows that can make human serum albumin. Albumin is a blood protein that regulates the transfer of fluids in the body and is critical for patients suffering from liver disease, extreme burns, malnourishment etc. Imagine a cow that can produce 80kg of albumin per year, what a boon to the hospitals !

Another milestone in 'pharming' is expected from PPL therapeutics, the Scottish firm that helped Edinburgh's Roslin Institute to clone Dolly the sheep,



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last year. They are developing a chemical technology to alter the genes so that when these animal lactate, their milk will have key elements of human blood plasma albumin, clotting factors and antibodies.