Dr. Rubin's six pronged approach to attacking cancer

1. CYTOTOXIC APPROACH

The administration of an agent which is directly toxic to tumor cells themselves, such as chemotherapy and some natural compounds

2. MOLECULAR INHIBITION

Since each person is different, lives a different type of lifestyle and thus develops cancer in different ways than other people, each individual cancer will exhibit different *molecular personalities*. This can be measured, and in response, a comprehensive treatment plan can be developed. For instance, many cancers of the colon, breast, and prostate express an enzyme called, cyclooxygenase 2 (COX2)—the expression of which is easily measured by laboratory staining of the tumor cells. Certain natural compounds as well as pharmaceuticals can block the action of this enzyme which may abrupt the growth of the cancer. Molecular inhibition usually results in the induction of a cellular process called, *apoptosis*. When apoptosis is initiated, the cell dies. In fact, when a tumor cell dies as a result of apoptosis, the tumor cell becomes very stimulatory to the immune system.

3. ANGIOGENESIS INHIBITION

The process of angiogenesis is, literally, the process whereby new blood vessels are developed. In order for a tumor to grow it needs to develop new blood vessels. The new vessels bring nutrition to the tumor cells as well as take waste away. Inhibition of new blood vessel development will therefore stunt the growth of the tumor, by decreasing waste removal and maintenance of tissue nutrition.

4. GROWTH FACTOR WITHDRAWAL/DECREASE METASTATIC POTENTIAL

All cells rely on growth factors for their survival. In this sense cancer cells are no different. However, two aspects of cancer cell growth or replication differ from those of normal cells: a) the rate at which they replicate and b) the loss of contact inhibition. The latter concept describes the process whereby normal cells grow, abut each other, and then stop growing. Cancer cells, on the other hand, do not stop growing when they abut each other which is why when tumors are formed they are disordered masses of tissue. In terms of the former, cancer cells replicate much more quickly than do normal cells of their type thus making them an appropriate target for growth factor withdrawal. When growth factors are

withdrawn the cancer cells go through the process of *apoptosis*, explained above.

5. REDIFFERENTIATION

This is an interesting concept, so think of it this way: imagine when a child is conceived by its parents….a sperm and an egg fuse to become one cell. Soon after, that one cells divides and becomes two cells, those two cells divide to become four cells, then 8 cells, then 16 and so on. At these stages, all of the cells look exactly alike, they are *not different*. However, as the embryo becomes a fetus the cells do begin to appear different so that when the child is born it is a functional human being. This baby, then, has distinct organ systems, structures, appearances, etc… in effect, the cells that once appeared exactly similar to each other have become *differentiated*. Once differentiated, the cells maintain specific functions. For instance, pancreatic cells are responsible for the generation of digestive enzyme, immune system cells are responsible for fighting infections and other intrusive entities and liver cells are responsible for the general metabolism of nutrients, drugs, supplements, toxins, etc… in the body. However, if something goes wrong with these cells and they become cancerous, they begin to lose function. The degree of function lost correlates with the degree of *dedifferentiation* or *reversion to a more primitive state*, which also correlates with the aggressiveness of the cancer cell. In essence, the cells lose the specialized function they had acquired as they aged. *Redifferentiation* strategies are aimed at reclaiming those lost, specialized attributes the cells once had.

6. IMMUNE SYSTEM INDUCTION

Cancer is not a single cellular disease, rather it is a multifactorial event that occurs for different reasons in each person; it is a systemic disease that most of the time results from some form of immunodeficiency. Furthermore, it is well recognized that patients who have cancer have multiple defects in their immune pathways. An intact and properly functioning immune system has the potential to eradicate cancer. Immune system induction involves invigorating and empowering the white blood cells to kill cancer cells, both specifically and non-specifically. Immune system induction is not a simple process, in fact it is very complex and can be performed inappropriately.