Cancer metastasis is a complex, multistep process responsible for > 90% of cancer-related deaths. Cancer is the second leading cause of death globally and about 8.8 million people worldwide died from cancer (Liver 788 000, Lung 1.69 million, Colorectal 774 000, Stomach 754 000, Breast 571 000) in 2015¹. That is nearly 1 in 6 of all global deaths. Lung, prostate, colorectal, stomach and liver cancer are the most common types of cancer in men, while breast, colorectal, lung, cervix and stomach cancer are the most common among women. During metastasis, the primary tumor seeds pioneer cells that move out, invade adjacent tissues, and then travel to distant sites where they may succeed in founding new colonies called secondary tumors.¹

In the last few decades, a rich and complex body of knowledge has been generated in cancer, revealing cancer to be a disease involving dynamic changes in the genome. In 2000, Douglas Hanahan and Robert A. Weinberg² reported six hallmarks of cancer. They include sustaining proliferative signaling, evading growth suppressors, resisting cell death, enabling replicative immortality, inducing angiogenesis, and activating invasion and metastasis.²³ Underlying these hallmarks are genome instability, which generates the genetic diversity that expedites their acquisition, and inflammation. Cancer Initiation, detachment and organ-specific affinity of cancer cells to host cells in terms of the above mentioned hallmarks helped devise new potential therapies. To date, five cancer treatment modalities have been defined. Currently available cancer treatments include the traditional surgery (Cryosurgery, Lasers, Hyperthermia), radiotherapy (External Beam Radiation Therapy, Internal Radiation Therapy), and conventional chemotherapy (Oral, Intravenous (IV), Injection, Intrathecal, Intraperitoneal (IP), Intrarterial (IA), Topical), approaches and have been extended with two new modalities in recent decades: molecularly targeted therapy (MTT) (Small molecule drugs, antibodies) and immunotherapy Monoclonal antibodies, Adoptive cell transfer, Cytokines, Treatment Vaccines, Bacillus Calmette-Guérin (BCG)).³⁴ The most important goal of targeted therapy or more advanced immune-based strategies is to eradicate cancer cells more specifically than traditional therapies while maintaining an acceptable level of side effects and quality of life. Unfortunately, the newly developed targeted agents or techniques show a similar incidence and severity of toxicities as traditional cytotoxic agents do.

With a full clarity of mechanism, cancer prognosis and treatment will become a rational science. It's a dream that one day the patchwork quilt of major fields like cell biology, genetics, histopathology, biochemistry, immunology, pharmacology and physics will detect and identify all stages of cancer progression and will be able to prevent incipient cancers from developing and will cure preexisting cancers.

REFERENCES

1. World Health Organization, NCD Management Unit, Geneva, Switzerland
   http://www.who.int/cancer
2. Douglas Hanahan¹,², * and Robert A.¹


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