

The Era of Genome-based Targeted Therapy of Cancer

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Decades of genome-based discoveries that resolved the molecular basis of the neoplastic process (cancer development) are finally yielding new approaches to detect, treat and prevent cancer. Alongside, molecular biologists are paving new methods to classification of the many subtypes of cancer, which opens the way for patient-tailored treatments. Yet another important contribution comes from genetic engineers who manipulate antibody molecules, thereby enabling mobilization of powerful defense machineries against cancer. My lecture will review these strides by referring to specific examples relevant to the roles played by growth factors and their receptors in tumor initiation, recruitment of blood vessels (angiogenesis) and colonization of distant organs (metastasis). Specifically, I will highlight the important insights of the relatively young field of systems biology, and describe how concepts derived from engineering influence the views of biologists interested in cancer therapy.

References

1. Citri, A., and Yarden, Y. (2006). EGF-ERBB signalling: towards the systems level. *Nat Rev Mol Cell Biol* 7, 505-516.
2. Amit, I., Wides, R., and Yarden, Y. (2007). Evolvable signaling networks of receptor tyrosine kinases: relevance of robustness to malignancy and to cancer therapy. *Mol Syst Biol* 3, 151.
3. Mosesson, Y., Mills, G.B., and Yarden, Y. (2008). Derailed endocytosis: an emerging feature of cancer. *Nat Rev Cancer* 8, 835-850.
4. Amit, I., Citri, A., Shay, T., Lu, Y., Katz, M., Zhang, F., Tarcic, G., Siwak, D., Lahad, J., Jacob-Hirsch, J., et al. (2007). A module of negative feedback regulators defines growth factor signaling. *Nat Genet* 39, 503-512. (Mosesson et al., 2008)