Hans Lehrach, Biol syst Open Access 2016, 5:2 (Suppl)
http://dx.doi.org/10.4172/2329-6577.C1.004

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Virtualized drug development for (truly) personalized drug therapy

Every patient is different. In particular, every tumor is different. Even subgroups of tumor cells can react differently to specific therapies, due to the heterogeneity of many tumors. Drug therapies therefore typically only help a fraction of patients; many patients do not respond with some suffering sometimes severe side effects of ineffective treatments. The ability to identify effects and possible side effects of different drugs on individual patients will, in our view, require highly detailed molecular analyses of every individual patient and his/her individual disease; data that is integral to generating individualized computer models, which can then be used to test the effects of drugs (or other therapies) on the individual. This will, on one hand, provide a basis for a truly personalized selection of therapies optimal for the individual patient, first in cancer patients but increasingly also in other areas of medicine and prevention. It will, however, also open the way to an increasing virtualization of the drug development process, by e.g., virtual clinical trials of drug candidates carried out throughout the development process.

Biography

Hans Lehrach has studied Chemistry in Vienna and obtained his PhD at the Max Planck Institute for Experimental Medicine and the MPI for Biophysical Chemistry in 1974. He then moved on to Harvard University, Boston (1974-1978) and then became Group Leader at EMBL, Heidelberg (1978-1987). He has then joined the Imperial Cancer Research Fund, London (1987-1994) as a Head of the Genome Analysis Department. In 1994, he has returned to Germany to become Director at the MPI for Molecular Genetics. He has founded several biotechnology companies such as Sequana Therapeutics, GPC Biotech, Scienion, Prot@gen, PSF Biotech and Atlas Biolabs. He is the Founder of the Berlin-based company Alacris Theranostics GmbH, specializing in the development of new approaches for personalized medicine for cancer patient diagnosis, treatment and drug stratification. In 2010, he has founded the non-for-profit research institute Dahlem Centre for Genome Research and Medical Systems Biology.

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