A scenic route to infectiology drug discovery

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These days drug discovery for the treatment of infectious disease seems to be a rather simple effort considering all the sophisticated new techniques and methodologies that are now available in many laboratories. For example, using 2D gel electrophoresis in combination with mass spectrometry and bioinformatics tools, the analysis of the proteome or alternatively the metabolome of a given infective organism in comparison to its host might be a tedious task, but is certainly feasible. Following this analysis, a parasite-specific and essential protein or enzyme can be readily defined, cloned, heterologously expressed, isolated, crystallized and analyzed by X-ray crystallography to yield the correct 3D structure as an authentic basis for the molecular design of specific and highly effective drugs. This straightforward and easy to follow concept has been applied many times during the last decade but, surprisingly enough, with only limited success in terms of the appearance of applicable new drugs. The reasons for failures are probably complex and may be different in each individual case. This shows, however, that drug development is still far away from becoming a defined and automated operating sequence with a guarantee of success.

It is thus a timely and meritorious endeavor to publish a book series dedicated to Drug Discovery in Infectious Diseases [1–6]. It is the explicit aim of the series editor, Paul M. Selzer (MSD Animal Health Intervet Innovation, Schwanheim, Germany), together with all his accompanying volume editors, to present a complete picture of the current status of drug development of the different disciplines of infectiology. Two volumes have already appeared on the topics of Antiparasitic and Antibacterial Drug Discovery: From Molecular Targets to Drug Candidates [1] and Apicomplexan Parasites: Molecular Approaches Toward Targeted Drug Development [2], while the next volume entitled Parasitic Helminths: Targets, Screens, Drugs and Vaccines is on its way [3]. Following its appearance as early electronic release in the spring and as a print version in the summer, three additional volumes with the following provisional titles are currently in preparation: Drug Discovery for Trypanosomatid Diseases [4], Protein Phosphorylation in Eukaryotic Parasites: Potential for Chemotherapy [5], and Signaling in Life Cycle Stages of Malaria Parasites [6]. The series will eventually be completed by additional titles on other important infectious disease-causing agents including but not limited to ectoparasites, bacteria and viruses.

Taken together, and as judged from the content of the volumes already published, the complete series is a well-edited collection of highly diverse contributions on the central theme of ‘drug discovery and drug resistance’. These different angles to view a single problem open new avenues to stroll along when considering novel perspectives in our common struggle to develop effective and applicable medicines in the fight against the global problem of infectious diseases. The book series is not a collection of recipes but a library of reviews that presents a diverse scenery of experience and knowledge. The lay reader will find easy access to the respective topics, while the expert reader is guided to the specific field he/she is interested in. In any case, it is enjoyable reading because the data presented are concisely summarized and put into perspective by experts in each of the respective research areas. It is indeed timely to present this very ambitious project because infectious diseases are still a major global health problem, and so far we have no conclusive answers regarding how to deal with malaria, tuberculosis, different forms of influenza, and HIV, to name but a few. Moreover, drug resistance is becoming equally as important as drug development, thus pushing the latter to even more sophisticated strategies. Considering also the spread of infective organisms around the globe due to the speed of travel, movement of goods and animals, and possible redistribution of locally defined illnesses (e.g. sleeping sickness, leishmaniasis, malaria) because of climate change, infectious diseases will undoubtedly remain a major problem for the coming decade and beyond. The book series described here is an important step to make researchers aware about forthcoming problems and to unify the community to build a network of expertise and to work closely together in the struggle to combat infectious diseases by developing new strategies against organisms that had, during evolution, millions of years to adapt perfectly to their respective hosts.

References

4 Flohé, L. et al., eds Drug Discovery for Trypanosomatid Diseases (Drug Discovery in Infectious Diseases, Vol. IV), Wiley-Blackwell (in press)

5 Doerig. C. et al., eds Protein phosphorylation in Eukaryotic Parasites: Potential for Chemotherapy (Drug Discovery in Infectious Diseases, Vol. V), Wiley-Blackwell (to be announced)

6 Doerig, C. et al., eds Signaling in Life Cycle Stages of Malaria Parasites (Drug Discovery in Infectious Diseases, Vol. VI). Wiley-Blackwell (to be announced)

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