ABSTRACT BOOK ABSTRACTS



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HISTORY OF DERMATOLOGY

FROM TÜBINGEN CASTLE TO NEXT-GENERATION SEQUENCING: A BRIEF HISTORY OF GENOMICS

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Background: The field of genomics can trace its origins back to 1871 in Tübingen castle, when Friedrich Miescher isolated 'nuclein' from the cell nucleus. For many years the significance of this discovery wasn't fully appreciated. How could all the information about an organism's features be stored in such a simple molecule?

Observation: This changed in the 20th century after the work of Avery et al. and Hershey and Chase demonstrated that DNA was the carrier of genetic information, not protein. In 1953, the three-dimensional structure of DNA was then reported, which sparked further research in the field. Recently appointed NIH research biochemist, Marshall Nirenberg, showed that certain sequences of bases could code for specific amino acids. Although initially his presentation was received by an audience of just 35 people, a serendipitous meeting with Watson in 1961 propelled it to the global stage.

Key message: Coding was exciting, but sequencing at this time was difficult. Scientists were spending years laboriously producing limited sequences from accessible RNA targets. However, in 1977, Fred Sanger developed "dideoxy" technique for DNA sequencing ('Sanger sequencing'). Together with concomitant developments in bioinformatics, this led to the sequencing of ever-larger genomes and ultimately the launch of The Human Genomes Project in 1990. Continued advances led to genome-wide association studies and then next-generation sequencing techniques in 2005, which have contributed to modern Dermatology practice. In 2002, mutations of the BRAF gene were identified in almost half of melanoma cases, and this led to the groundbreaking development of targeted therapies. A genome-wide association study in 2007 also identified variations in the IL-23 receptor gene in patients with psoriasis, leading to biologics targeting components of IL-23 (ustekinumab) and its downstream pathway (IL-17 by secukinumab). This article further discusses the history of genomics and how this has influenced Dermatology practice today.





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