

The First Sequence: Fred Sanger and Insulin

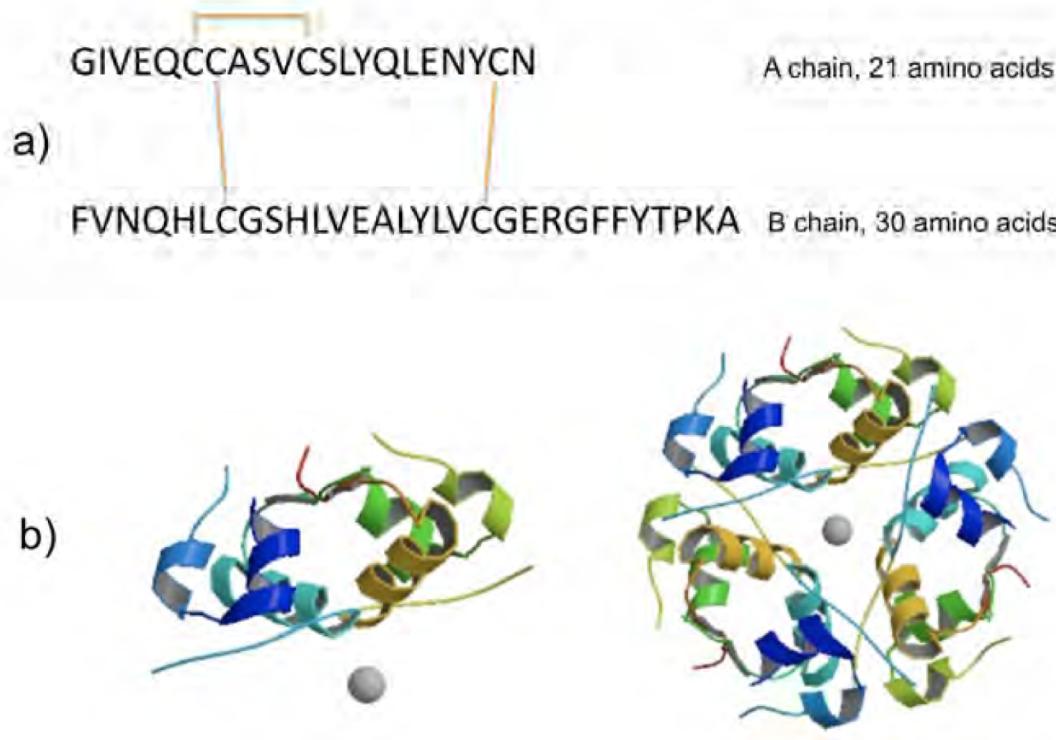
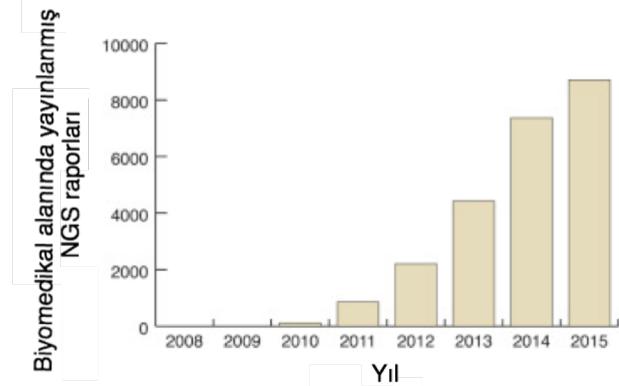
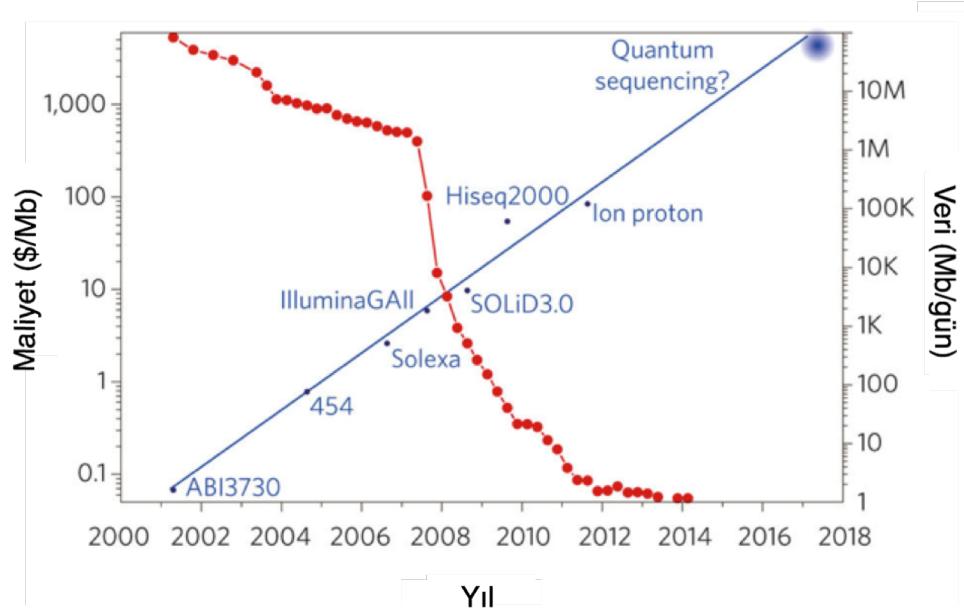


Fig. 1. Illustration of a) the primary structure of bovine insulin, showing intra- and interchain disulphide bonds connecting the a and b chains; and b) its zinc-coordinated tertiary structure (2INS), revealing two molecules in the asymmetric unit, and a hexameric biological assembly.

Year	Protein	RNA	DNA	No. of residues
1935	Insulin			1
1945	Insulin			2
1947	Gramicidin S			5
1949	Insulin			9
1955	Insulin			51
1960	Ribonuclease			120
1965		tRNA _{Ala}		75
1967		5S RNA		120
1968			Bacteriophage λ	12
1977			Bacteriophage ϕX 174	5,375
1978			Bacteriophage ϕX 174	5,386
1981			Mitochondria	16,569
1982			Bacteriophage λ	48,502
1984			Epstein-Barr virus	172,282
2004			<i>Homo sapiens</i>	2.85 billion

Table 2. Sequencing landmarks.

Genomik Devrim

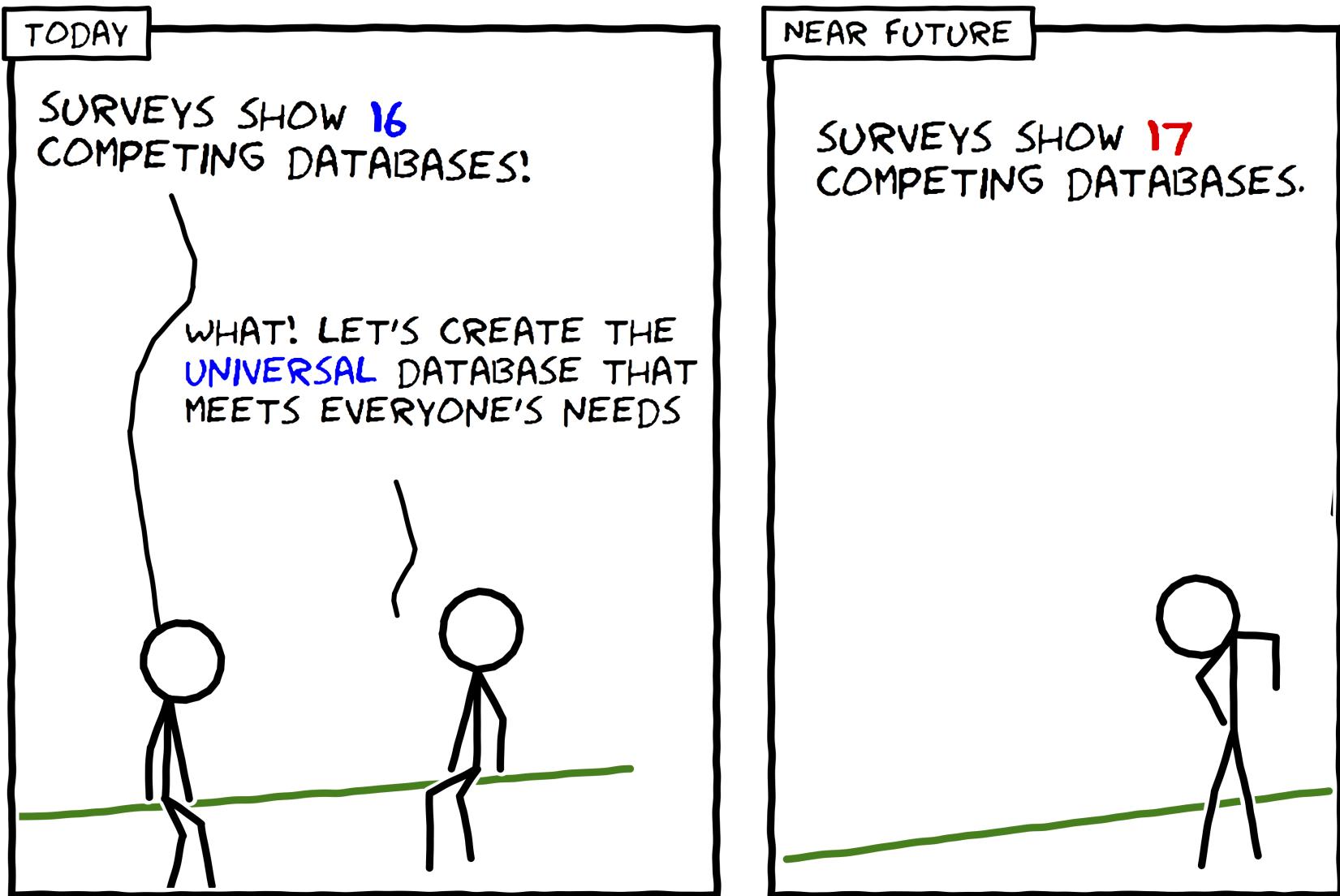


“omics” ve veri tabanları

- Nükleik asit veri tabanları
 - DNA (EMBL, GenBank, 23andMe, HapMap, etc)
 - Gen ifadesi (Ensembl, RGD, Xenbase, flybase, etc)
 - Fenotip (RGD, PomBase, PHI-base)
 - RNA (miRBase, Rfam, etc)
- Amino asit/protein veri tabanları
 - Protein dizisi (PROSITE, Swiss-Prot, NCBI, etc)
 - Protein yapısı (PDB, SCOP, 2PI2db)
 - Protein modelleme (PMP, Swiss-model, SIMAP, etc)
 - Protein-protein ve protein ile diğer moleküllerin etkileşimi (BioGRID)
 - Protein ifadesi (Human Protein Atlas)
- Sinyal transdüksiyonu veri tabanları (Netpath, Reactome, etc)
- Metabolik yolaklar ve protein fonksiyonu veri tabanları (BIGG Models, KEGG, etc)
- Model organizmalar hk veri tabanları (dictybase, flybase)
- Meta veri tabanları (Entrez NCBI)
- Diğerleri
 - ekzozom (ExoCarta, exoRBase)
 - taksonomi (EzTaxon-e)
 - matematik (Biomodels Database)
 - radyolojik (The Cancer Imaging Archive, Neuroimaging tools..)

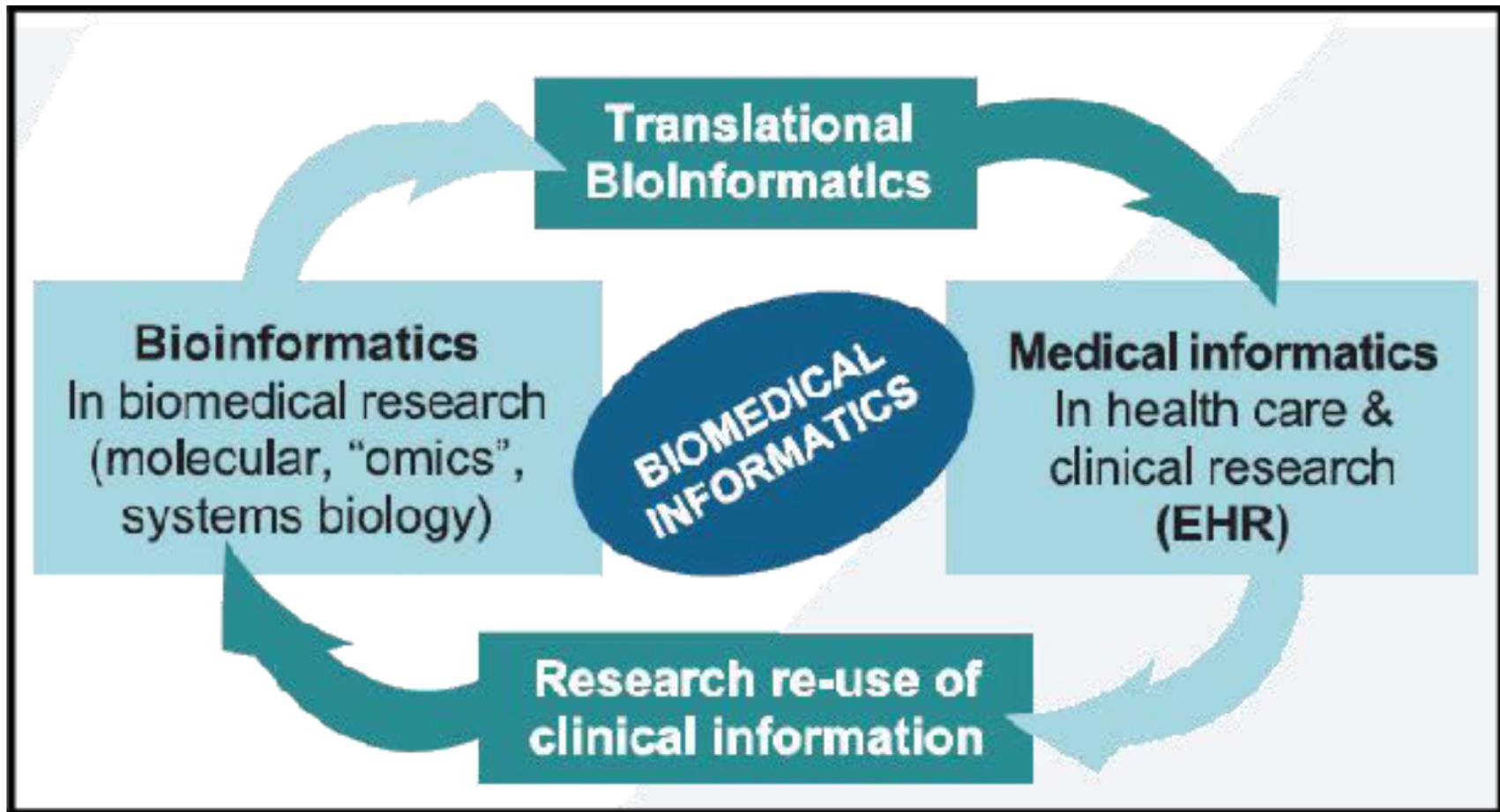


HOW BIOLOGICAL DATABASES PROLIFERATE



doi: <https://doi.org/10.1371/journal.pcbi.1005128.g001>

Evrimsel Genombilim Kis Okulu 2019



	Primary database	Secondary database
Synonyms	Archival database	Curated database; knowledgebase
Source of data	Direct submission of experimentally-derived data from researchers	Results of analysis, literature research and interpretation, often of data in primary databases
Examples	<ul style="list-style-type: none"> • ENA, GenBank and DDBJ (nucleotide sequence) • ArrayExpress Archive and GEO (functional genomics data) • Protein Data Bank (PDB; coordinates of three-dimensional macromolecular structures) 	<ul style="list-style-type: none"> • InterPro (protein families, motifs and domains) • UniProt Knowledgebase (sequence and functional information on proteins) • Ensembl (variation, function, regulation and more layered onto whole genome sequences)

