**Bioinformatics Project Answer Key**

1. The Biochemical Literature

1. What are the titles of the last two papers Max Perutz published before his death in 2002?

Aggregation of proteins with expanded glutamine and alanine repeats of the glutamine-rich and asparagine-rich domains of Sup35 and of the amyloid beta-peptide of amyloid plaques.

Amyloid fibers are water-filled nanotubes

2. The transport of what molecule was discussed by Michael S. Brown in Proc. Natl. Acad. Sci. in October 2008?

Michael S. Brown examined the transport of cholesterol.

Infante RE, Wang ML, Radhakrishnan A, Kwon HJ, Brown MS, Goldstein JL. NPC2 facilitates bidirectional transfer of cholesterol between NPC1 and lipid bilayers, a step in cholesterol egress from lysosomes. Proc Natl Acad Sci U S A. 2008 Oct 7;105(40):15287-92. Epub 2008 Sep 4. PMID: 18772377)

3. In 2012, who investigated the treatment of mice with oseltamivir-resistant H1N1 flu?

Several groups reported research results. For example:

Smee DF, Julander JG, Bart Tarbet E, Gross M, Nguyen J. [Treatment of oseltamivir-resistant influenza A (H1N1) virus infections in mice with antiviral agents.](http://www.ncbi.nlm.nih.gov/pubmed/22809862) Antiviral Res. 2012 Jul 15;96(1):13-20. [Epub ahead of print] PMID: 22809862

4. Kari Stefansson and his team compared DNA sequences of men and their children and reported the results in *Nature*. What was the effect of the father’s age?

Stefansson’s research team found that the rate of mutations increases with the father’s age.

Kong A, Frigge ML, Masson G, Besenbacher S, Sulem P, Magnusson G, Gudjonsson SA, Sigurdsson A, Jonasdottir A, Jonasdottir A, Wong WS, Sigurdsson G, Walters GB, Steinberg S, Helgason H, Thorleifsson G, Gudbjartsson DF, Helgason A, Magnusson OT, Thorsteinsdottir U, Stefansson K. [Rate of de novo mutations and the importance of father's age to disease risk.](http://www.ncbi.nlm.nih.gov/pubmed/22914163) Nature. 2012 Aug 23;488(7412):471-5. doi: 10.1038/nature11396.

5. Has anyone been able to determine the structure of the connexin protein by electron crystallography? Have they been able to do this by X-ray crystallography?

Cheng A, Schweissinger D, [Dawood F](http://www.ncbi.nlm.nih.gov/pubmed?term=Dawood%20F%5BAuthor%5D&cauthor=true&cauthor_uid=14681014), [Kumar N](http://www.ncbi.nlm.nih.gov/pubmed?term=Kumar%20N%5BAuthor%5D&cauthor=true&cauthor_uid=14681014), [Yeager M](http://www.ncbi.nlm.nih.gov/pubmed?term=Yeager%20M%5BAuthor%5D&cauthor=true&cauthor_uid=14681014). Projection structure of full length connexin 43 by electron cryo-crystallography. Cell Commun Adhes. 2003 Jul-Dec;10(4-6):187-91.

Maeda S, [Nakagawa S](http://www.ncbi.nlm.nih.gov/pubmed?term=Nakagawa%20S%5BAuthor%5D&cauthor=true&cauthor_uid=19340074), [Suga M](http://www.ncbi.nlm.nih.gov/pubmed?term=Suga%20M%5BAuthor%5D&cauthor=true&cauthor_uid=19340074), [Yamashita E](http://www.ncbi.nlm.nih.gov/pubmed?term=Yamashita%20E%5BAuthor%5D&cauthor=true&cauthor_uid=19340074), [Oshima A](http://www.ncbi.nlm.nih.gov/pubmed?term=Oshima%20A%5BAuthor%5D&cauthor=true&cauthor_uid=19340074), [Fujiyoshi Y](http://www.ncbi.nlm.nih.gov/pubmed?term=Fujiyoshi%20Y%5BAuthor%5D&cauthor=true&cauthor_uid=19340074), [Tsukihara T](http://www.ncbi.nlm.nih.gov/pubmed?term=Tsukihara%20T%5BAuthor%5D&cauthor=true&cauthor_uid=19340074). Structure of the connexin 26 gap junction channel at 3.5 A resolution. Nature. 2009 Apr 2;458(7238):597-602.

6. What has been discovered recently about the mechanism of the enzyme isocitrate dehydrogenase?

This is an active area of research so answers may vary. One example of a recent paper is

Gonçalves S, Miller SP, Carrondo MA, Dean AM, Matias PM. [Induced Fit and the Catalytic Mechanism of Isocitrate Dehydrogenase.](http://www.ncbi.nlm.nih.gov/pubmed/22891681) Biochemistry. 2012 Aug 27. [Epub ahead of print] PMID: 22891681 [PubMed - as supplied by publisher]