T1DBase: type 1 diabetes, and my part in its downfall

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Apropos of a new T1DBase publication (Burren et al. 2011) (in which I am kindly acknowledged), I thought I'd write a bit about some of the work I did there (Hulbert et al. 2007). I envisage this being the first of maybe three instalments, so before going into detail about the specific projects that I worked on, I'll explain what T1DBase actually is, and why I'm proud to have worked on the project.

T1DBase is a resource for the type 1 diabetes (T1D) research community, and it has strong ties to the JDRF/WT Diabetes and Inflammation Laboratory (DIL) in Cambridge, which is headed up by John Todd. (When I worked at the DIL we collaborated with the ISB and a group at UPenn, but this is no longer the case.) Type 1 diabetes is an auto-immune disease, that primarily manifests in childhood, so was formerly known as juvenile diabetes. The symptoms are similar to those of type 2 diabetes, but the aetiology is quite different (Todd 2010), and type 1 diabetes is genetically more similar to diseases like rheumatoid arthritis and coeliac disease (Smyth et al. 2008).

I worked on T1DBase for three years, from Jan 2006 to Dec 2008, which was a period of massive change in our understanding of the genetics of type 1 diabetes, primarily due to the emergence of genome-wide association studies (GWAS). The DIL was heavily involved in one of the first landmark studies (Todd et al. 2007; Wellcome Trust Case Control Consortium 2007), as part of the WTCCC (Wellcome Trust Case Control Consortium; don't worry, I think that's the last of the acronyms). Results from that and subsequent GWAS (e.g. Cooper et al. 2008; Barrett et al. 2009) generated a host of new T1D susceptibility regions, and a better (although still far-from-complete) appreciation of the genetics of this complex disease. (I've cited GWAS publications that I was involved in, or that were written by colleagues at the DIL, but T1DBase also gets data from a range of other sources; see the website for more information.)

The people behind T1DBase curate the GWAS results, and make them available as raw data and, more usefully, as region summaries that tie to analyses of genes and variants (i.e. SNPs), as well as cross-referencing with mouse and rat data. It sounds so simple when you write a sentence like that, but there are, of course, very many challenges involved, both in terms of making sense of a huge amount of biological data, and in

working out how to effectively present the results. And that's not to mention the day-to-day work of maintaining a website, and programming collaboratively and efficiently. I very much enjoyed working on the T1DBase project; I learnt loads, both about disease genetics and programming, and it was always a fun environment to work in (with regular tea breaks, too...) And it was nice to be in a job where, in some small way, I might be able to constructively contribute to important and useful research into type 1 diabetes.

Citing this Document

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References

Barrett JC, Clayton DG, Concannon P, Akolkar B, Cooper JD, Erlich HA, Julier C, Morahan G, Nerup J, Nierras C et al. 2009. Genome-wide association study and meta-analysis find that over 40 loci affect risk of type 1 diabetes. *Nature Genetics* **41**(6): 703-707. PubMed: 19430480

Burren OS, Adlem EC, Achuthan P, Christensen M, Coulson RMR, Todd JA. 2011. T1DBase: update 2011, organization and presentation of large-scale data sets for type 1 diabetes research. *Nucleic Acids Research* **39**(Database issue): D997-D1001. PubMed: 20937630

Cooper JD, Smyth DJ, Smiles AM, Plagnol V, Walker NM, Allen JE, Downes K, Barrett JC, Healy BC, Mychaleckyj JC et al. 2008. Meta-analysis of genome-wide association study data identifies additional type 1 diabetes risk loci. *Nature Genetics* **40**(12): 1399-1401. PubMed: 18978792

Hulbert EM, Smink LJ, Adlem EC, Allen JE, Burdick DB, Burren OS, Cassen VM, Cavnor CC, Dolman GE, Flamez D et al. 2007. T1DBase: integration and presentation of complex data for type 1 diabetes research. *Nucleic Acids Research* **35**(Database issue): D742-746. PubMed: 17169983

Smyth DJ, Plagnol V, Walker NM, Cooper JD, Downes K, Yang JHM, Howson JMM, Stevens H, McManus R, Wijmenga C et al. 2008. Shared and distinct genetic variants in type 1 diabetes and celiac disease. *The New England Journal of Medicine* **359**(26): 2767-2777. PubMed: 19073967

Todd JA. 2010. Etiology of type 1 diabetes. *Immunity* **32**(4): 457-467. PubMed: 20412756

Todd JA, Walker NM, Cooper JD, Smyth DJ, Downes K, Plagnol V, Bailey R, Nejentsev S, Field SF, Payne F et al. 2007. Robust associations of four new chromosome regions from genome-wide analyses of type 1 diabetes. *Nature Genetics* **39**(7): 857-864. PubMed: 17554260

Wellcome Trust Case Control Consortium. 2007. Genome-wide association study of 14,000 cases of seven common diseases and 3,000 shared controls. *Nature* **447**(7145): 661-678. PubMed: 17554300