N E W S L E T T E R

Australasian Society for Immunology Incorporated

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The Immune System in 15 Minutes

Jim Goding

Students often have the mistaken idea that learning is all about memorising and regurgitating an endless list of facts. I think that the most important thing is learning how to think and solve problems. Students generally regard the exams as defining the curriculum. If we want to produce thoughtful graduates, we need to ask questions that encourage thinking rather than rote learning.

Accordingly, I set out to ask a seemingly very simple question, which required very little detailed factual knowledge, but was designed to test the ability to integrate, to see the sideways connections, and to see what is really important. Students were to be given no more than 30 minutes, and no more than one page, to answer the following question:

"How does the immune system work?"

A Faculty member from another department (who shall be nameless) said that the question was unfair because "you could write a book about it".

I was well aware of how hard a question it was. That's why I set it! I therefore set out to test myself. Since I am not an undergraduate student, I only allowed myself 15 minutes. The person who said that it was an unfair question gave me 7 out of 10, which was probably about right.

Having tested myself, I decided to ask Gus Nossal and Ian Mackay if they were willing to give it a go; no more than 15 minutes, and no more than one page. Both of them graciously agreed.

After the answers were received I considered publishing our efforts in the ASI Newsletter. I then started to think about the hazards of allowing such raw, unpolished material to see the light of day. Normally, any published manuscript has been through countless revisions. We agreed to allow ourselves to write brief "afterthoughts" consisting of what we might have said if we had more time or space, but without changing the original answer in any way.

We all found this exercise quite challenging. We invite readers to form their own opinions of how we did.

The three 15 minute essays can be found on pages 8 and 9.

Gus Nossal features twice in this issue. His summary of the immune system penned in 15 minutes can be found on page 8. Here he is pictured giving this years Jonathon Sprent oration at the BIG meeting. Gus's infectious optimism is inspiring the audience to believe that old and new scourges can be eliminated by global vaccination strategies.

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Website

The ASI web site (www.wehi.edu.au/collegiate/ASI/) has been fully remodelled and updated. New services include:

- Downloadable forms for ASI awards,
- Positions vacant pages,
- Jobs wanted pages,
- Upcoming conferences listings,

as well as a plethora of links to sites of immunological interest at home and abroad. If you'd like your lab home pages linked to the site, would like to advertise a job or conference, or have a favourite immunology-related site that doesn't currently appear on the ASI site, please e-mail Judy Greer at j.greer@medicine.uq.edu.au

Email bulletin board

To subscribe to the ASI bulletin board, send an email to majordomo@explode.unsw.edu.au with the message: subscribe anz-imm.

EDITORIAL

Geoff Shellam take a bow. In the early 1990s while president of ASI, Geoff sought to encourage the development of branch activities by devising a formula for distributing funds back to branches. The formula has been through quite a few revisions since and branch activities have waxed and waned over the decade. However, judging by the contributions to this newletter the goal of encouraging state branch activity has really taken off around our two countries. We have the amusing and comprehensive report of the Brisbane Immunology Group (BIG) from Norbert Keinzle. This meeting attracted 130 delegates and, if the photos are any indication, a great deal of social collaboration. The NSW branch held a meeting at Wisemans Ferry which was a productive time at an outstanding venue according to Helen Briscoe. 'Immunet' in New Zealand attracted 48 attendees and included a number of visiting speakers. The Immunology Group of Victoria (IgV) held their annual meeting at Beechworth amidst perfect weather. This also was strongly attended and reached a very high standard of presentation. These regional meetings are important opportunities for honours and PhD students to attend a first scientific conference and become inspired by science and our local scientists. The organised social activities at these meetings are more relaxed and accessible than is possible to achieve at the much larger annual meeting. So well done to Geoff and all the State Councillors who worked so hard over the last decade to bring about this very healthy situation.

Another theme in this issue is the search for innovative ways to motivate people to think! We have a unique challenge set by Jim Goding – explain immunology in 15 minutes. The responses of Jim, Gus Nossal and Ian Mackay make fascinating reading. There are obvious common themes, such as the need to distinguish self from non-self, the concept of clonal selection and the categorisation of immunocytes into T and B cell components. There are also interesting differences of emphasis and in style. I was struck by Ian Mackay's comment that the immune system might be classed as a sixth (non-conscious) sense and his emphasis on the population of cells themselves forming a single "recognition machine". Gus Nossal managed to advertise the importance of vaccination in his final sentence underlining his renowned preparedness to take every opportunity to get important messages across.

Please have a go at your own 15 minute 'exam' or feel free to send comments on the attempts we have published here.

The other innovative schemes are mentioned in Norbert's article. At the BIG meeting they experimented with "innovative modes of information delivery and processing". They included think tank groups, a hot bits session and a smartest question award. The hot bits session sounds intriguing. Here a panel of eminent scientists face questions (razor sharp according to Norbert) delivered by the chair. This might be worth trying also at our annual meeting. This is another benefit of our local meetings. The opportunity to light-heartedly experiment in this way should be encouraged as the provocation to think, debate and try things out is fundamental to our survival as scientists.

A final note. Our last issue presented an interview with Jacques Miller. Not long after the newsletter went to press it was announced that Jacques was to receive the 2003 Prime Minister's prize for science. Congratulations to Jacques again for another outstanding award.

Phil Hodgkin

HONORARY SECRETARY'S NEWS

1. Student Travel Award Recipients

Congratulations to the recipients of ASI Student Travel Award bursaries to attend the Annual Meeting in Perth:

Lynette Beattie – QIMR
Alison Every – WEHI
Adrian Liston – JCSMR, ANU
Cindy Ma – University of Sydney
Melissa Martyn – WEHI
Kate Matthews – Malagham Institute of Medical Research
Lachlan Molden-Hauer – University of Adelaide
Dianne Muller – University of Queensland
Judy Peng – University of Queensland
Alexandra Spencer – University of Sydney
Diego Silva – JCSMR, ANU
Michele Teng – Peter MacCallum Cancer Institute
Marilyn Thien – Centenary Institute
Yang Wang – JCSMR, ANU
Karen White – University of Otago
Jonathan Williman – University of Otago

We look forward to seeing you in Perth and hearing your presentations.

2. Annual General Meeting

The ASI Annual General Meeting will be held at lunchtime on Tuesday 9 December. This is a good opportunity for the whole membership to be involved in the Society and to have your input. I therefore strongly encourage everyone at the Scientific Meeting to attend. If you have any items that you wish to have included on the agenda, please email them to me.

3. Membership Renewals

You will find your membership renewal form included with this newsletter. It is easy to lose these in the piles of paper that furnish most desks (not yours, of course). It does often happen to me, particularly at this time of year. So please make a note to renew your membership.

Hope to see many of you in Perth

Cheers,
Geeta Chaudhri

Two days & one night with BIG science …

Norbert Kienzle

More than 130 scientists gathered at the 4th annual meeting of the Brisbane Immunology Group, BIG, at the Rydges Oasis Resort on the Sunshine Coast in Caloundra. From 21–22 August 2003, the scientific focus was on exchange of the latest developments in immunology cooking in "Bris-brain-ian' (recently coined by ASI member Simon Apte after an intense caffeine intake) and interstate labs, and in the groups from the invited overseas speakers. For a full account of the meeting and scientific abstracts, please view the BIG webpage http://www.qimr.edu.au/big/. The main contingent of delegates was made up by immunologists from the Queensland Institute of Medical Reseach (QIMR), followed by researchers from the Mater Medical Research Institute (MMRI), the Centre for Immunology & Cancer Research (CICR) and various research groups from the University of Queensland (UQ) and Queensland University of Technology (QUT).

Two days of science …

The scientific flagships of this meeting, as every year, were the talks of the international and national guest speakers and the Jonathan Sprent Oration. Professor Andreas Radbruch, Director of the German Rheumaforschungs-zentrum in Berlin, started off the meeting with data from his institute showing how expression of cytokines, in particular IL-4 and IL-10, is regulated in the memory response of mouse CD4 T cells. Using novel developed tools to track cytokine surface secretion on live cells, Andreas and his collaborators measured how molecular events like de-methylation of the IL-4 gene, and binding of the GATA-3 transcription factor to evolutionary highly conserved intron sites in the IL-4 gene, contribute to the cytokine expression pattern of memory Th2 cells. Andreas' scientific and entrepreneurial skills in generating these novel cytometric cytokine secretion assays gave an encouraging example of how to merge basic science with commercial returns.

An equally stimulating contribution came from Professor Alan Rickinson from the Institute for Cancer Studies at the University of Birmingham, UK. Alan is one of the international icons in the virology and immunology of Epstein Barr virus (EBV) and well known for his work on EBV-specific CD8 T cell responses and their impact on clearing tumor cells, like Burkitt's lymphoma, in humans. However, this time Alan showed us that EBV is always good for some more surprises, i.e. a so far unappreciated hierarchy of immunodominance of CD4 T cells specific for epitopes in some of the nuclear EBNA proteins of the virus. The big question, nevertheless, is still open, i.e. if and how these EBV-specific CD4 T cell responses contribute to the elimination of EBV-positive tumors, or could be harnessed for future immunotherapy regimes.

Continuing in the field of tumor immunology and back to mouse models, Professor Chris Parish from the John Curtin School of Medical Research in Canberra, educated us in his newest developments in how to fight melanoma tumors. Chris presented a double hit approach, first by activating players of the innate immune system by IL-4-producing, tumor-specific CD4 T cells; these type-2 polarized T cells attract eosionphils whose subsequent degranulation leads to destruction of tumor metastases in the lung. The second hit involves a novel intellectual property-loaded 'stealthing' of dendritic cells (DC) via liposomes containing tumor-specific antigens: by highly specific targeting of tumor antigens to the DCs, both cognate CD4 and CD8 T cell responses are activated, resulting in total clearance of melanoma metastases; what a fantastic result, at least for this mouse model!

Finally, Professor Ian Frazer from the CICR set a fine example for our local talent and is the 2003 BIG Icon. Ian gave us a fascinating report on how basic science in virology and tumor immunology on a widespread infection, human papilloma virus (HPV), can make a big contribution to the health of man- (or better woman-) kind, and translate into big $$ success. Based on a prophylactic vaccination strategy with recombinant HPV virus-like particles, the common strains of HPV-induced cervical cancer can now be totally prevented in sexually active women. So now imagine the potential political clout of Ian the Viral Terminator whenever he 'will be back' with political aspirations.

Another BIG highlight was the annual Jonathan Sprent Oration, delivered by Emeritus Professor Sir Gustav Nossal from the University of Melbourne. Gus started off with the remark that he feels a bit awkward receiving an award named after one of his former students; however, this achievement truly reflects the humbleness and great spirit of Gus, the mentor, and his exceptional bright former student Jonathon Sprent who went on to become one of the doyens in T cell immunology (unfortunately, Jonathon could not attend this year's meeting, unlike all the last years). Gus enlightened us about the new challenges for global vaccination strategies against viral infections (HIV, hepatitis B, polio), malaria and tuberculosis in a troubled world. It was fascinating to listen to how this godfather of Australian immunology meets and plots strategies with members of the highest echelons in science, politics and commerce. After hearing Gus' talk, there was no alternative but to be infected with his enthusiastic and inspiring optimism that we can indeed successfully combat these global infections that result in so much mortality and morbidity, particularly in regions of the

Figure 1. *Vanessa Rowe, QIMR student and spiritual sister to Delta Goodrem, contemplates the merits of Science in the early morning hours; note that Vanessa's Mum was a former beauty queen in regional New Zealand.*

world inhabited by the poorest people. We are very indebted to Gus that he gave BIG the honor with this talk and his presence during the meeting.

As with every year, the conference organizers experimented with innovative modes of information delivery and processing. This included Think Tank groups, the Hot Bit session, free-drinks-lubricated Poster session including two $200 Best Poster awards and an inaugural "Smartest Question" prize in order to boost the discussion participation of the delegates.

A definite ice-breaker was the Hot Bits session, proving to be educative and amusing in its second year. The panel of the Hot Bits (which sometimes looked more like Hot Seats) consisted of eminent male scientists who were even matches in their eloquence and entertaining quality, and could only be discriminated by their variable degrees of baldness. These pillars of immunology and virology had to respond to razor-sharp questions, delivered with missile-guided precision by the two session MCs, A/Profs Ranjeny Thomas and Andreas Suhrbier. Cunningly, the MCs gave the questions to the panel member only the night before, and it did not help some of them that their short-term memory was temporarily deviated by the free drinks during the Poster session that night before. However we heard some very reflective and entertaining thoughts about the prospects of anti-HIV vaccines, whether regulatory CD4 T cells are good or bad for cancer therapy and about the increasingly Kafkaesque ways of bureaucratic gene regulatory affairs. Some fellow delegates participated in the discussion thereby adding more entertainment and scientific value to this show of grandeur.

Part of the success of this annual meeting is the plethora of local talent showing off the current work of students and post-docs. This success was demonstrated in the postgraduate session whose winning formula this year was a mixture of six ten-minutes presentations followed by two minutes of discussion time. Afterwards, the presentations were constructively 'dissected' in Think Tank groups of 15–20 delegates focusing on one of the presentations each. One aim was to analyze the data on its scientific strength and weakness and thus to give constructive feedback to the researcher. Another task was to create appeal to the tabloid media, an increasing demand for scientists, who have to translate their (publicly funded) research findings into layman terms for the public. The Think Tank groups had to come up with a 'killer headline' and an up-to-two-sentence summary for a tabloid newspaper. The results were truly entertaining, with some of the headlines making hard-core media buffs blush and being beyond the scope of this (family) Newsletter. But let me indulge you with just a couple of examples. Firstly, Andy Hsu's data about optimizing RNA loading for DC-mediated adoptive immunotherapy at the MMRI triggered the following headline and abstract: "*Catching the RNA show – it's not just about the EKKA.* New techniques tear out rogue genetic material and zap it into 'cellular tanks'. These cells then reprogram the immune system to fight cancer." Secondly, Vanessa Rowe from QIMR presented her data on the role of host B cells in graft versus host disease which mutated into the following lines: *"New Zealand wins again: New hope for Delta!* A post-graduate student at QIMR has discovered evidence that transplant patients may die as a result of the removal of an important blood cell during treatment for lymphoma. Equipped with this knowledge, Ms Rowe, an avid Delta Goodrem fan, is working towards improving therapies for this devastating disease." (see Figure 1 opposite).

One night of science …

But the real drivers of scientific success were revealed in a secret workshop, which this author was privileged to encounter by chance. The theme in apartment #16 would be best described as 'After Midnight', as judged on the basis of the party atmosphere and the median age of the attendees suggesting lack of any reference to the famous guitarist Eric Clapton (so far there was no feedback from the mature-age residents of the neighboring apartments). Dutch student Wendy van Zuylen and fellow QIMR students whipped up a magical concoction (Figure 2) that produced unexpected effects among the inoculated delegates. Compared to the first documented concoction-induced activation of the immune system and its positive influence on tumor clearance in some patients (Coley 1893 Am. J. Med. Sci. 105:487), Wendy & Co's magical mix was more attractive and would have tasted better then William Coley's famous experimental 1890s' mix. This modern version of witchcraft had indeed strange effects on the social fabric of the delegates, bringing out powerful argumentation styles

Figure 2. *QIMR student Wendy van Zuylen whips up her magical concoction. The question is still open about the scientific merit and reproducibility of strange events induced by this "After Midnight" brew.*

(Figure 3), fostering homo-physical attraction (Figure 4) and attracting nubile sirens to the (powerful) opposite sex (Figures 5 & 6). One can only speculate if these effects were linked to increased expression of chemokines or so far uncharacterized 'attraction'-receptors; however, if reproducible, these remarkable and potentially heavy IP-loaded "After Midnight" findings could be subject to a new CRC program bid. In reference to a previous article by James McCluskey in this Newsletter that argued for a strong correlation between manual dexterity and experimental success on the bench, one can truly augur a stellar scientific career for the creators of this magical mix.

In summary, this author was indeed grateful to be part of such an occult experience in mystical forces happening not in some remote jungle village in the Amazon, but on our doorsteps on the Sunshine Coast.

If you want to be part of this magical mix of science and entertainment, come along to the next BIG meeting at the Twin Waters Resort at the Sunshine Coast, August 19–20, 2004.

Figures 3–7 over page

Two days & one night ... (cont.)

Figure 3 (below). *QIMR fellows Joane Davis and Maher Gandhi practice interactive discussion techniques. It is not known whether Maher could make his point at this time of the night.*

Figure 4 (above). *Conference organizers Alejandro Lopez from QIMR and Mike McGuckin from MMRI celebrate life after midnight and symbolize the embracement of their hosting scientific institutes.*

Figures 5 & 6:
Middle-aged conference organizers Graham Leggatt (CICR) and Norbert Kienzle (QIMR) surround themselves by young female stars from QIMR (Kate Green, Julie Dudley) and CICR (Melanie Andrews, Linnea Moritz).

Contributions sought for the ASI Newsletter

Deadline for the next issue

1st February 2004

Please email your contributions to the Secretariat by the above date.

asi@21century.com.au

Sustaining Membership

ASI Inc acknowledges the support of the following sustaining members:

- Jomar Diagnostics
- Dynal Biotech Pty Ltd

UPCOMING LECTURES & CONFERENCES

7–11 December 2003
33rd Annual Scientific Meeting of ASI
Perth, Western Australia
Website: www.congresswest.com.au/ASI2003

14–17 May 2004
II World Congress on Immunopathology & Respiratory Allergy
Moscow, Russia
Website: http://www.isir.ru or http://www.immunopathology.org

18–23 July 2004
12th International Congress of Immunology 2004
and 4th Annual Conference of FOCIS (ICI-FOCIS 2004)
Montreal, Canada
Website: www.immuno2004.org

3–7 October 2004
1st International Conference on Basic and Clinical Immunogenomics (BCI'2004)
Budapest, Hungary, organised by Hungarian Society for Immunology
Website: http://www.diamond-congress.hu/bci2004/

The Walter and Eliza Hall Institute of Medical Research

Wednesday Seminars
1pm, WEHI Lecture Theatre, 7th Floor, Parkville – Visitors welcome

November 26
Biochemical pathways regulated by the tyrosine kinase Lyn following B cell receptor signalling – Yuekang Xu (Immunology Division)

December 3
SCL – Losing its TALent for making blood! – Dr Mark Hall (Rotary Bone Marrow Laboratory, The Royal Melbourne Hospital)

WEHI Seminars on the Web:
www.wehi.edu/seminars/

discussion on this topic.

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SPF Chickens
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Email arcwa@arcwa.wa.gov.au Web Site www.arcwa.wa.gov.au

How Does the Immune System Work?

Jim Goding's Attempt

The primary function of the immune system is selective destruction (Parham's first item). In other words, the job of the immune system is to destroy anything that is foreign to the body (i.e. nonself), such as viruses, bacteria, and other micro-organisms. It may also destroy tissue transplants, and possibly cancers, although the latter is controversial. If it fails in this role, as occurs in HIV/AIDS, the result is death due to overwhelming infection.

The fundamental challenge facing the immune system is how to distinguish between what is self and what is foreign (i.e. nonself). The fact that the immune system does not normally destroy "self" is called "tolerance". This is a particularly difficult challenge because the differences between self and nonself may be extremely small. For example, a graft from another person would only differ by 0.1% of its amino acids. Obviously, tolerance cannot be encoded in the germline, since the germline of a man cannot know what will be in the germline of the woman he is to marry. Hence, self-tolerance must be learned in each individual.

Distinction between self and nonself, and the carrying out of selective destruction are carried out by the cells of the immune system, the most important of which is the lymphocyte. Lymphocytes are small round cells that all look the same, but in fact each is different in terms of its specificity (i.e. what antigen it can react with). The "eyes" of the lymphocyte are receptor molecules on the cell surface which bind antigen and signal the cell to become activated. When antigen comes into the body, it bounces around until it finds a lymphocyte or lymphocytes that react to it. The lymphocyte then becomes activated, and carries out its effector functions (selective destruction). This is known as the Clonal Selection Theory.

Self tolerance is complex, but a simple way to understand it is that self-reactive clones are deleted from the body soon after they are born. There are undoubtedly other mechanisms at work as well.

Lymphocytes can be divided into T cells, which are made in the thymus and which are responsible for graft rejection and killing virally infected cells, and B cells, which are made in the bone marrow and when activated secrete antibodies, which are proteins that bind foreign substances and destroy them by facilitating phagocytosis by macrophages, and other mechanisms.

Jim Goding's Afterthoughts

The initial brief did not specify the nature of the audience, which is the most important thing when asked to write something! My approach was to explain the immune system in a very simple way, minimising jargon and assuming little prior knowledge.

My answer had a serious flaw in that it was not self-contained. It referred to Peter Parham's list, which is given below. I use this list as a series of discussion topics for students.

Insufficient emphasis was given to the innate immune system and the way that antigen is captured, transported, processed and presented.

Given a second chance, I would have included a couple of sentences on the genetic mechanisms by which clonal diversity is created, in particular somatic rearrangements of antibody and T cell receptor genes, and somatic mutations that allow affinity maturation in B cells.

The immune system as a defense organization (In: Parham, P. Some savage cuts in defense. *Nature* 344: 709, 1990)

1. Its function is selective destruction.
2. It is large, complicated and elaborate.
3. It is expensive.
4. It is wasteful.
5. It has distinct components performing apparently identical functions.
6. It is slow to react.
7. It is prepared for events that never happen.
8. It fights today's problems with the solutions of past problems.
9. It is susceptible to corruption.
10. It can destroy that which it protects.

Gus Nossal's Attempt

The immune system is nature's defence against infectious diseases. For mammals such as humans, it is an elaborate machinery superimposed on evolutionarily very ancient recognition systems. Organisms as primitive as starfish or fruit-flies possess genes which code for receptors that can recognise certain molecular patterns coming from bacteria or viruses. These genes are expressed on the surface of scavenger cells, which therefore attract and engulf invading pathogens. In a mammal, the most important such scavenger cells are called dendritic cells.

When a dendritic cell takes up a pathogen, it becomes activated and initiates an interaction with a specialised white blood cell termed a T lymphocyte. There are in fact two sorts of lymphocytes in the mammal, namely T cells which defend the body by secreting powerful inflammatory substances called lymphokines, or by killing infected cells through direct contact; and B lymphocytes which protect by secreting specific antibody molecules, especially valuable in preventing re-infection by a particular germ. T lymphocytes help B lymphocytes get moving to do their job.

Whereas T cells are born in the thymus and B cells in the bone marrow, they are soon exported to the blood stream and congregate in special tissues such as lymph nodes and spleen. This is where the encounter with pathogen material takes place. Both T and B cells recognise pathogen-derived materials or antigens via specific receptors on their surface. Nature has devised a unique process involving the shuffling of a limited number of minigenes during the development of each T and B lymphocyte such that each cell carries multiple copies of just one receptor or recognition unit. The activated dendritic cell must "find" a T cell with the "right" receptor, which must then find a B cell with the right receptor. Then both T cells and B cells start

dividing and engender the immune response. Antibodies are good at recognising what is on the outside of a pathogen. Amazingly, by a complex system, T cells can also react to fragments of molecules on the inside of germs, and manage to kill target cells in which a virus or bacterium may be hiding.

It is important for T and B cells not to react to components of the body itself. An elaborate set of processes ensures that self-reactive cells are either killed within their birthplace or are counterbalanced by regulatory (or suppressor) T cells. When this process, through which the lymphocyte system "tolerates" self, breaks down, serious diseases (which we term autoimmune) supervene.

Lymphocytes, particularly T cells, can damage organ transplants. They can also sometimes kill cancer cells. In fact, both transplant and cancer immunology have become large fields of study. Certain types of antibody to pollens, food components or artificial chemicals, can cause dangerous allergies. So immunology has a "life" well beyond concerns with infectious diseases. This being said, vaccines which artificially stimulate the immune system without subjecting the individual to the hazard of a disease remain history's most cost-effective public health tool.

Gus Nossal's Afterthoughts

The special role of the lymphatic circulation in bringing pathogens to lymphoid tissues should have been explained.

The fact that somatic assembly of immunoglobulin and T cell receptor genes creates a huge repertoire is implicit but should have been put more clearly. Affinity maturation through somatic mutations should have been included.

Processing and the generation of the T cell epitope/MHC complex should have been more fully explained.

Had time permitted, clonal anergy should have been mentioned.

Reference should have been made to the fact that cancer cells have many ways of evading the immune response.

It should have been stressed that vaccines are disease-specific.

Particular examples of autoimmune diseases would have helped.

Ian Mackay's Attempt

The immune system is a "recognition machine" which carries many millions of recognition units, each on either a soluble circulating antibody molecule derived from a B lymphocyte, a T lymphocyte, or a phagocytic dendritic cell (DC). This massive recognition system distinguishes the immune system from all other systems in which functional modulation is achieved through a relatively small number of receptors for activating or inhibitory ligands.

The recognition units carried by DCs are part of the innate immune system: these are carried by all cells and are designed to recognise engulf and destroy anything bearing a cognate pattern, usually "pathogen-associated molecular patterns" that are structurally unrelated to "host" or self-patterns.

The recognition units carried by B and T lymphocytes are individually carried by single cells and their clonal descendants. There are sufficient number of cells to represent all molecular sequences in nature, but since there are so many of these, potentially millions, only a few cells in a naive animal will carry a representative unit. Hence the first thing that must happen when a lymphocyte encounters a cognate pattern is a proliferative burst as a result of a signal transduced from the recognition unit - a receptor - enabling the production of an amplified clone. Thus, by reason of cellular interactions or production of neutralising antibodies, eliminates the unwanted pattern, usually a structure carried by a micro-organism.

Potentially, of course, lymphocytes may carry a recognition unit, or receptor, corresponding to to a pattern (self) belonging to the host itself. Such cells are removed or inactivated - "silenced" - by a range of "contrivances" in Ehrlich's phrasing, that ensures a state of tolerance to structures of the host itself. The system works extremely well, albeit not perfectly, since on occasions a foreign pattern is not recognised, or a self-pattern is inappropriately recognised.

Ian Mackay's Afterthoughts

As a victim of allegations that I generally require 20 or so drafts before an article is "completed", it was an agreeable surprise to find little to add to my 15-minute synopsis.

I could add that, whilst our five (or is it six?) special senses also serve as discriminatory "recognition machines" the immune system differs by reason of its guided mobility so allowing for placement of the right cell in the right place at the right time. Moreover, in contrast to the special senses (and fortunately for us), all this with no conscious effort!

Further, there is the capacity for learning and "remembrance of things past" - memory - developed by elaborate tooling up processes in early life. Yet, vast as may be immunological memory within one individual, it can still be "subthreshold" for the potential antigenic universe, such that the "recognition machines" of the community need to be pooled for what is termed herd immunity.

The final element of the machine is the disposal systems. These comprise the fluid phase antibodies secreted by B lymphocytes and complement systems, which operate in conjunction with scavenger cells, and the T lymphocytes which recognise and dispose of unwanted elements in conjunction with molecules of the highly polymorphic molecules of the major histocompatibility complex displayed on the surface of cells.

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ASI Councillors' News

Queensland News

During the last four years the annual meeting of the Brisbane Immunology Group, BIG, has advanced to one of the highlights in the busy activity schedule of Brisbane's immunologists. For two days and one night more than 130 scientists from Queensland and far beyond gathered at the Rydges Oasis Resort in Caloundra from 21–22 August. Besides a plethora of local talent, we enjoyed high-profile presentations of national- (Chris Parish, Ian Frazer, Gus Nossal) and international-based 'heavy weights' in immunology (Andreas Radbruch, Alan Rickinson). For a full account of the meeting and scientific abstracts, please view the BIG webpage http://www.qimr.edu.au/big/. A more unconventional view of the meeting is provided in this issue of the newsletter. As every year, a major focus was the postgraduate session in which students and post-docs gave short (10 minute) presentations; the six talks were then constructively "dissected" in discussion groups. One of the discussion tasks was to distill from the presented science a "killer headline" for the tabloid media. The conference organizers experimented again with novel ways to make the meeting more lively, for example in the Hot Bits session in which selected senior immunologists were quizzed on their views on current controversies in immunology. Congratulations to students Julie McAuley from MMRI and Simon Apte from QIMR who both won the Best BIG Poster prize awarded by an internal judging panel, and to Dr Alberto Pinzon-Charry from QIMR who was awarded the "Smartest Question" prize.

Thanks to the ASI sponsorship for internationally acclaimed immunologists, we enjoyed two gripping scientific presentations at QIMR and the BIG meeting presented by Professor Andreas Radbruch from the German Rheumaforschungszentrum in Berlin. Andreas educated us about the newest techniques of detecting cytokine expression on live cells and how these tools can be elegantly used to further our understanding in the establishment and function of B and T cell memory. Andreas and his wife Carmen underwent an exhaustive touring schedule in NZ and Australia, and after giving six talks in Dunedin, Melbourne, Canberra and Brisbane, they finally had some rest at the Sunshine Coast. However, both enjoyed their trip very much and have promised to be back!

Thanks to sponsorship of the Queensland ASI branch and the CRC for Vaccine Technology, BIG members enjoyed a series of stimulating, high-octane talks at the regular QIMR Immunology meetings. Melbourne-based Drs Stephen Turner, Chen Weisan and Gabrielle Belz stunned us with their latest research in CD8 T cell activation and antigen presentation during viral infection. These speakers made it again clear why Melbourne is still the centre of immunology in Australia, a view which was a joyful bone of contention at last year's inaugural Kevin Lafferty Memorial Debate at the ASI meeting in Brisbane. Since a few months ago, QIMR scientists are engaged in fortnightly journal club discussions about novel findings in immunology. This series, initiated by A/Prof Alejandro Lopez from QIMR, provides critical thinking and teaches us to spot the "scientific holes" in articles of high-impact journals.

Immunology is also alive in other parts of Queensland; for example Dr Graham Burgess from the James Cook University (JCU) co-organized the 5th Microbiology at Mission Beach conference on 16-17 August this year. The Queensland ASI branch was proud to sponsor the attendance of two JCU students (D. Gorton & H. Gallagher) who presented their data.

Finally, I wish to say goodbye as the Queensland ASI councillor. Thank you for your support and the wonderful contacts you provided during my two years' service in the "bright" State.

Norbert Kienzle
Councillor

A.C.T. News

ACT ASI members have enjoyed three outstanding seminars as part of the JCSMR seminar series from leading Australian Immunologists in recent months. These included Mark Smyth who presented a talk entitled "Tumour Immunity – from hypothesis to new horizons", Mariapia Degli-Esposti on "Key players in antiviral responses" and David Tarlinton on "B cell differentiation in the germinal centre".

An "Immunology in the ACT" day meeting is being organised for March next year. The aim of this day is for ACT ASI members to showcase their research to the local immunology community, with a particular focus on students, who will be given an opportunity to talk about their work. Details of the event will be forwarded to members early next year.

I would like to thank all the students who applied for the travel awards to the Perth conference this year. Congratulations to the ACT ASI winners Adrian Liston and Yang Wang.

Finally, I would again like to bring to the attention of ASI members the upcoming 11th Frank and Bobbie Fenner Conference which runs from Friday 28th to Saturday 29th November at the JCSMR, Canberra. This year the symposium will focus on areas of immunology and microbiology to mark the retirement of Prof Robert Blanden from a distinguished career at the JCSMR. Full details available at
http://jcsmr.anu.edu.au/FennerConference2003/

Mark Hulett
Councillor

An invitation and a request to all ASI members

to contribute copy that they think might be interesting, useful, historical, humorous or thought provoking.

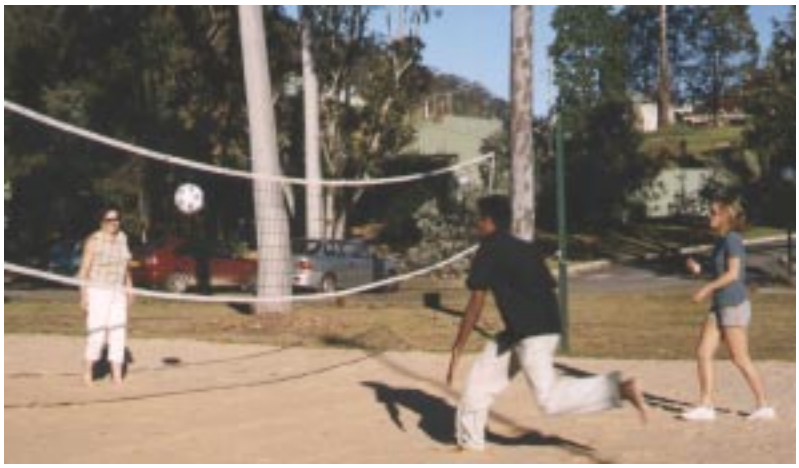
- Our Student Page is specifically designed for our student membership to voice their views on issues that interest or directly concern them.
- It's our newsletter, so let's support it and strive to make it even better.
- The ASI newsletter comes out 4 times a year and we welcome your contributions.

N.S.W. News

In September ASI NSW held its branch meeting at The Retreat, Wisemans Ferry. There were a select small number of delegates which meant that everyone had opportunity to speak. Delegates presented their work in progress and two of our guest speakers re-lived their overseas experiences: Pablo Silveira at Jackson Labs, Bar Harbor and Warwick Britton at NAIAD, Washington. Paul Tan, our third guest, tempted us to a career in corporate science. The venue was excellent (smart choice, Kristine) – good food, good wine and beer and a choice of sporting and after dinner activities. I've been asked not to report on the volleyball injuries or the karaoke: so I won't. I will include these photographs and urge more members to join us next year. As you see, age is no barrier and it is an enjoyable and worthwhile event.

We are looking forward to a visit from Dr Peter Bretscher after the Fenner Conference in November and we have some thoughts for nominating a visiting speaker to coincide with the Autoimmunity meeting in Sydney in 2004.

Helen Briscoe
Councillor



Victorian News

Recently, Victorian members once again enjoyed the beautiful surrounds of Beechworth and the high country for the 11th annual IgV meeting. Good weather, food, wine and company blessed the meeting. The Scientific Program was once again very strong with a general theme of dendritic cell biology. Special thanks to all the invited speakers, particularly Professor Ken Shortman for his keynote talk and the participation of other group leaders from the WEHI, Ludwig, University of Melbourne and Austin Research Institute. Although we missed our ACT and Tasmanian colleagues, many thanks to Mariapia Degli-Esposti (WA) for speaking at our meeting. Students once again made up a large proportion of attendees and their presentations and participation were of an excellent standard. Winners of student prizes this year included Melissa Martyn (WEHI) – best student presentation and ASI bursary nomination; Maria Moeller (Peter Mac) – best student presentation and IgV prize; Alison Corbett, Jeremy Swann, Nick van de Welde, and Sarah Londrigan, Shayna Street – special distinction for presentation; and Shayna Street – best student questions – congratulations to you all.

Thank you to all the attendees who supported the meeting and to the members of IgV committee who worked behind the scenes to make the meeting another success. In particular, Andrew Lew for his organization of the scientific program, Frank Alderuccio for putting together the abstract book, and Grant Morahan and Ian Barr for co-ordinating the venue and running of the meeting. Karaoke replaced the trivia night as this year's entertainment and many thanks to Ian Barr for organising the equipment and egging many party goers on quite late into the evening – particularly memorable were the Meatloaf solos performed by our tireless and favourite treasurer.

Final thanks to CSL Ltd, Radiometer Pacific and the CRC for Vaccine Technology for their generous support of the annual meeting.

The Tom Mandel Islet Transplant Program Transplantation of insulin-producing islet cells has recently emerged as a promising potential cure for type 1 diabetes. St Vincent's Hospital is bringing islet transplantation to patients in Victoria by developing a Melbourne-wide collaborative clinical transplant program while working on methods of improving the survival of transplanted islets and reducing the need for immunosuppression. Currently islet isolation procedures are being perfected and it is hoped that transplants into patients will begin in 2004.

This will be my last report as state councillor, so many thanks to all the IgV committee members for their support over the past three years. I urge members to continue their ongoing interest in local Immunology and trust you will provide the incoming councillor plenty of good ideas and material of interest. It has been my pleasure serving the Victorian/ Tasmanian membership.

Mark Smyth
Councillor

W.A. News

WA ASI members have been treated to a number of fantastic presentations by international guests over the last few months. August saw visits from Dr N. Davis-Pointer (Animal Health Trust, UK) who spoke about novel herpesvirus chemokine binding proteins, and Prof E. Peterhans (University of Bern, Switzerland) who presented work on Bovine viral diarrhoea. More recently Dr P Lyons (Cambridge University, UK) visited Perth and gave a presentation entitled "Unravelling the inherited basis of susceptibility to type I diabetes in the NOD mouse". We are also looking forward to a visit by Prof S. Wesselingh (Alfred Hospital, Melbourne) which is generously supported by Boehringer Ingleheim.

The organising committee for ASI2003 has been busy putting the finishing touches to the scientific program and social events. The number of registrations and abstracts received has significantly exceeded expectations, with over 400 people expected to attend the conference. We are looking forward to seeing everyone in December for what promises to be a great conference.

Christopher Andoniou
Councillor

N.Z. News

First piece of news from across the ditch is that the Malaghan Institute is on the move. The Malaghan Institue for Medical Research is NZ's largest biomedical research institute. Luckily it is not going far – just across town, from its present site at the School of Medicine to Victoria University. While the move is physically not a big one, it is a major change in that the Malaghan will no longer be associated with the University of Otago but with Victoria University. They will be getting new purpose built laboratories and (perhaps more importantly) a SPF animal facility. The move is expected to occur early next year.

The annual Immunet meeting was held in Dunedin in September. Immunet is funded by the University of Otago and gives immunologists from all around NZ a chance to get together, share ideas and form collaborations. This year, after a last minute change of venue, the meeting was held in a church hall. There were 48 participants with a stronger than usual contingent of postgraduate students. Our keynote speaker was Dr Kim Burnham from Oklahoma State University. Dr Burnham is at Victoria University as Fulbright Senior Scholar and he gave a very entertaining lecture on dendritic cell biology. This year we also had a student session with the students competing for a prize of a free ticket to the meeting dinner. Our judges couldn't agree on a winner so the conference organizer (Glenn Buchan) was forced to fork out for two dinners for our winners Jeremy Wales and Kate Matthews. All the student talks were of a very high standard although no one could explain why church halls always smell so funny!

Professor Andreas Radbruch from the German Arthritis Research Centre in Berlin visited three New Zealand centres as part of his ASI sponsored tour in August. Andreas's interests are in the fields of Autoimmunity, Chemokines/cytokines, TH1/TH2, memory and Plasma Cells. He visited Auckland, Wellington and Dunedin where he gave an excellent talk on "Fixing effector function: the memory for cytokines and antibodies". Andreas was a superb guest and an inspired choice for an ASI travelling fellow.

Sarah Hook
Councillor