University of Otago
Te Whare Wananga o Otago

Centre for Gene Research
NEWSLETTER

Editor: Craig Marshall craigm@clutha.otago.ac.nz

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Centre for Gene Research News

Sequencer News

Thanks to the Lottery Heath, the "stretch" upgrade has now been installed and is currently being fine-tuned to ensure optimal performance. We also have our new thermal cycler operating. The advantage of the stretch upgrade advantage is that we should now be able to provide much longer sequences from each run. Once it is going properly, I am afraid there will be a small adjustment in our charges such that the dye primer reactions will now cost $20 (internal) and $26 (external). Costs for dye terminator reactions will remain at $26 (internal) and $30 (external). The external charges are also subject to GST. These changes will be instituted sometime in September and will run until the end if the year when depending on the amount of divisional support, it may be necessary to make further increases. These will be notified to customers as soon as we know where we stand. Customers will also note the invoices will be coming more rapidly than before. By arrangement with the University accounting system, we are now producing our own invoices. Payment should still be made to the Registry as before.

Research Management Plan

Many people at Otago will be aware that the University is developing a Research Management Plan with identified priority themes. Departments were invited to make submissions as to the which research areas should be regarded as priority themes. Other groups have made "cross-department" themes. Research Centres were belatedly included in the request for submissions. The Centre for Gene Research in the meantime had made a joint submission with the Department of Biochemistry that Gene Research indeed had to be regarded as one of the priority areas. Our case was supported by the publication list prepared earlier in the year and in a covering letter, I stressed the fact that the Centre covered not only departments within Health Sciences at Otago, but also other groups in the Division of Sciences and people at the Clinical Schools in Christchurch and Wellington. The process of developing this Research Management Plan is an ongoing one and I shall be pleased to notify members of the Centre of any progress as it is passed on to me.

Murray Grigor
Director

Editorial

Conferences That Bite

The Health Research Council recently organized a conference entitled "Whose Genes are They Anyway". Warren Tate has a report on this on page 2 of this newsletter. Considerable media attention was attracted by this conference with its aim of examining ethical and social concerns raised by applications of molecular biology and gene technology.

When I first saw the circular advertising the conference I was puzzled by what was intended. There appeared to be few people involved in organizing the conference who could be considered authorities on genes and genetic engineering although those with ethical, legal and "cultural" expertise were prominent. What was the intention of the HRC in mounting this conference?

It has become clear that the documents coming from this conference are intended to serve as the basis for future decisions concerning the applications of molecular biology and gene technology in New Zealand. As scientists have we been well served by this process?

On the whole I think not. As people who work in this area I believe we have a unique insight into what is possible and what is practicable. I would not want to suggest that scientists be the final arbiters, but it seems to me that we have a right to be actively involved in making such decisions. Although it may well be the case that further consultations may occur before final policy is decided upon, there seems to have been little opportunity for those working in the area to have their say in this matter. The HRC may also have missed an opportunity to educate. Many of those attending the conference had very little idea of what is possible in this area and it seems that many attendees were very interested in what could be done. To have missed this chance of reaching an informed consent seems a great pity.

And now to bites of another kind. There has been a trend over recent years for conference registration to cost much more than it did formerly. This increase is often associated with a move to use professional conference organizers. On the whole this seems to have been a good thing and conference organizers certainly go to enormous trouble to stage a conference offering a good program at a reasonable price. However, some

conference and workshop costs have risen far past the $200 mark and are now closer to a thousand dollars. This would seem to be something of a barrier for the less well-funded, and particularly for students. Should the aim of conferences be to make a profit or to break even? If people are unable to attend because of lack of money, the point of such occasions is lost.

Craig Marshall

A Report on the HRC Consensus Development Conference

"Whose genes are they anyway"

I was given a grant-in-aid from the Centre for Gene Research in a sense to carry a flag for those Dunedin scientists working with what the public perceives is the 'new' DNA technology. Since *they* are the membership of the Centre for Gene Research I hope the following account gives you an insight into the conference.

The provocative conference theme meant different things to different people. I went perhaps naively hoping to debate an open question, clearly some of the tangata whenua thought it was a rhetorical question with an implied one word answer, the Privacy Commissioner wasn't sure that the answer should be the police, representatives of the insurance industry felt it was theirs (although wishing the whole issue would go away), members of support groups for specific genetic defects hoped that scientists would claim the genes which concerned them, some at the epidemiology/policy making interface thought it depended on what we could afford, and it was a little difficult for me to determine what it meant to the ethicists, being the wise Talmudic-like scholars that they are.

With that mix you can see we were in for an interesting time. I must say had I gone with a particular agenda, or barrow to push, I would have been very frustrated. This is because the conference assumed a particular character as it gained momentum with the tangata whenua a dominant force in moulding this character, and the scientists lagging far behind in setting agendas and in the maneuvering. This was not necessarily a bad thing, in fact it added a lift to the meeting and was quite different from the typical inflexible structure of the conferences I usually attend. There were downsides to this however, with the Maori and Pacific Island groups forming their own caucuses at workshop times to discuss the issues, and so there was less chance for the debate I was hoping for between groups. Some from these ethnic groups did join the planned workshop groups and that was valuable. Late in the day the scientists and philosophers also formed their own caucus and this served to make me realize how unfocused and unprepared we are as a group to debate these issues. A positive feature of our caucus however, was that I was able, with 2–3 others, to frame a section on Professional and Scientific values for the 'Consensus Report' that will come out of the conference. I list these from the draft report below:

As philosophers and scientists we believe that:

- Science is dedicated to the advance of knowledge within the limits of its own methodology
- Science is a global enterprise and is not specific to any one culture
- Science is essentially self critical and scientists recognize their findings as provisional
- The spirit of science is independent of commercial, political and religious interests
- The application of knowledge derived from science should be for human good and open for public scrutiny
- Science, as applied to genetics, includes study at the level of genes and recognizes these as a part of a whole
- Scientists welcome public debate on scientific issues relevant to genetic research
- Scientists recognize their responsibility to provide information based on research which will foster public debate

I came away from the conference with one or two lessons. Firstly scientists must speak out amongst themselves to lobby against initiatives which they see are wrong, and which, when wearing their second hat as decent members of society, they know are wrong. Otherwise they immediately lose the 'high moral ground' in the public forum. Such an example at the conference was the Human Genome Diversity Project. An ethicist/lawyer from Stanford, Professor Henry Greely, who is on the American committee considering this initiative, was the invited guest to talk about it, and naturally his expertise was not in promoting the scientific strength of the project. The project involves collecting samples from 500 of the world's 8000 populations or so and establishing genetic information on a data base- for what? So scientists can think up good projects to use the information apparently, and, knowing the opposition of indigenous peoples, Professor Greely said they only had to find 500 willing populations. So if an indigenous people

wished to opt out that was fine. I was starting to wonder of the scientific value at this point if the basis for selection became less than scientific, and an end point of establishing a data base for future good ideas made me somewhat uncomfortable (oops–we have applied these principles in our own research!).

Well, Aroha Mead (Director, Directorate Mataatua Declaration on the Cultural and Intellectual Property Rights of Indigenous Peoples) and representing the tangata whenua immediately grabbed the high moral ground on this issue. Firstly, American scientists have already taken samples from Panama, Solomon Islands and Papua New Guinea, established permanent cell lines and then lodged patent applications through the NIH, and the Department of Health and Human Services; that is for foreign governments and private companies to have exclusive ownership of cell lines derived from indigenous communities. How can the Human Diversity project now establish credibility? Moreover, Aroha Mead showed evidence of conference after conference of indigenous peoples around the world saying NO to the project. She said how many NOs is enough–when will scientists listen–a powerful message indeed, which largely went unchallenged. Visions of exploitation of Third World resources by multinationals with no benefits back to the people were spinning through my head–I was won over. Aroha Mead is an impressive powerful orator, one of a number of incredibly impressive Maori women with wonderful oral communication skills at the conference.

It was ironic that at the last Scientists and Philosophers Caucus meeting to discuss the draft consensus document, several people complained there was no supporting statements for the Human Diversity project. My response was that no one had supported it as presented, and the Maori and the Pacific island perspectives had largely gone unchallenged. The response to that was that it was all rather intimidating and there was a reluctance to be impolite and challenge the message (my interpretation of the discussion). This I think reflects a real weakness of our scientific community at present–it is difficult to stand up to these impressive eloquent spokespeople of the tangata whenua, and yet if the scientist's case is compelling then it needs to be thought out and presented equally as eloquently, particularly to correct misinformation.

Ironically I had my chance following the talk of Dr Moana Jackson on "genes, tangata whenua, and the genesis of sovereignty". His message came across to me that genetics was a form of colonisation, which the Maori didn't need–they understood their whakapapa and it was arrogant to suggest that genetics could add anything to the understanding they already had. His address was impressive, elegant and heart-felt, but the argument was greeted in stunned silence when it came time for comment. Realizing everything that had been said was going to go unchallenged I found myself getting up and heading to the front without knowing what I was going to say-but with an overwhelming feeling there had to be some equally heartfelt scientific response. I tried, I faltered, and was duly out-debated by a wide margin–but I felt good at least that the view that 'scientists are arrogant to think that they have something to offer, and devious in offering it', was at least challenged. At other points in the conference I was grateful that other scientists did speak up with authority, Barry Scott from Massey, and Don Love from Auckland for example.

There were many more issues discussed, privacy law, feminist viewpoint, ethical legal controls, health sector structures and policy guidelines, civil liberties etc. I will leave these for you to contemplate when the consensus statement is released. The one awakening issue which I feel slightly nervous about is that conferences like these make the lay person realize that scientists largely work on whatever takes their interest (within the ethical guidelines), and several people said to me shouldn't there be somebody determining what you work on. AHHHHHH!

Warren Tate 20.8.95

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Sabbatical Report

Graham Wallis
Department of Zoology
University of Otago

I have just returned from my year out on parole: six months at the University of Leicester, UK followed by 5 months at the University of Connecticut in Storrs. My time at Leicester was spent in Terry Burke's and Herbert Macgregor's labs, following up work from Post-Doc days there on *Triturus* (European newt) hybrid zones. It's quite a strange sensation going back somewhere after nine years, and getting the feeling that you've never left. I had the same bench space, and even discovered some old restriction enzymes of mine (never did try them out!). The department of Genetics is now headed by Gabby Dover. Every

morning I walked past a huge display of newspaper reports on the forensic, immigration, and various disinterment studies outside Alec Jeffreys' lab.

My time was spent doing a few hundred amplifications of 376bp of the *Triturus* mitochondrial cytb gene, the product of which I used to determine mtDNA type by RFLP analysis. This analysis has helped to understand patterns of introgression and the systematic status of eastern European newt populations. Most exciting were some results from a French hybrid zone which show differential introgression very clearly, perhaps due to mortality of F1 that is dependent upon direction of cross. Tania King accompanied me for two months to make a microsatellite library for *Hemideina maori* (Rock & Pillar weta). I attended a Royal Society meeting on phylogenetics at The Royal Institution. Topics included evolution of HIV, coevolution, biogeography, coalescence theory, and phylogenetic distinctiveness in conservation. It was quite incongruous to hear about the latest in molecular phylogenetics surrounded by the experimental apparatus of Tyndall, Rayleigh and Young, and bronze busts of Dewar and Bragg. I have written a report for SYSTANZ if anyone is interested in finding out more about the meeting.

The Department of Ecology & Evolutionary Biology at UConn was quite a contrast to my time at Yale some 15 years before. EEB is a relaxed and friendly department where the staff actually talk to each other and work together instead of cutting each other's throats like at the urban ivy league institute down the road. UConn is set in the heart of rural forested Connecticut as opposed to the crime-ridden New Haven on the coast, and was altogether more appropriate for a family visit. This was the data analysis/writing/thinking phase of the leave, and it was good to get to know the excellent graduate student body there. It drove home to me once again just how much broader-based and better-qualified the US PhD product is compared with that produced by the UK and NZ system. To be sure, they spend five years or more on it, but I think that it's worth it. The campus is basketball-crazy: the men reached the last eight of the NCAA finals and the women won all 35 games to take the national title.

I spent most of my time here analyzing seabird and louse mitochondrial 12S sequences and building secondary structures. This represented the start of some comparative work on insect 12S in collaboration with Chris Simon at UConn, who will be visiting Otago on a Fulbright for three weeks in December this year. During this time I also managed to get write up some of the isozyme work diagnosing the new species of galaxiid that we have found in the Taieri. I also took a week out to go to Amsterdam to do some morphometric work on preserved newt specimens; the finest collection of *Triturus* in the world! Just before we left CT, Brent Emerson dropped in on us on his way to a Post-Doc with Godfrey Hewitt at the University of East Anglia.

It was interesting to see that dissatisfaction and cynicism of big government had extended even to the US, where presidents have historically assumed god-like proportions. Many small businesses in California display a mock-up $3 "Bill" with Clinton in the centre, issued by "The Disgruntled States of America". The disillusioned Republicans who supported him in 1992 to do something about the budget deficit (which will soon have to be expressed as a log) look set to desert him in droves next year.

Some sabbatical statistics: 22 airport transfers with 19 pieces of luggage weighing over 300 kilos, 7 countries visited, 22 manuscripts worked on, 9 manuscripts submitted, 3 manuscripts accepted, 11 papers reviewed, 1 thesis examined, 3 grants written, 3 books read, 1 seminar given, 1 meeting attended, a few thousand email messages written and 365 (approximately) more grey hairs. I'm now looking forward to a well-earned rest...

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Group Profiles

Cancer Cell and Molecular Biology Programme

Malaghan Institute of Medical Research

Wellington School of Medicine

The Cancer Cell and Molecular Biology Programme was initiated in 1976 following the award of the Malaghan Fellowship to Mike Berridge by the Wellington Medical Research Foundation. Following 3 years based in the Wellington Hospital laboratories and in the Biochemistry Department at Victoria University of Wellington, the project became one of the founding research projects of the Wellington

Cancer and Medical Research Institute in 1979 when it was set up in new premises in the newly established Wellington Clinical School of Medicine. A common theme of the research has been one of understanding the control of blood cell production, initially by studying the blood-forming stem cell in the bone marrow, and then by pursuing collaborative studies on the erythropoietin receptor with Dr. Fu-Kuen Lin of Amgen Corporation, who had recently cloned the red blood cell-forming hormone, erythropoietin. Structure/function studies of the erythropoietin receptor using site-directed mutagenesis are continuing in the laboratory today. However, the programme is now primarily concerned with understanding growth factor regulation of glucose transport into cells through 'facilitative' glucose transporter molecules. The hypothesis that growth factors acutely regulate glucose transport by transporter phosphorylation and that this may be mandatory for the survival, growth and functioning of all cells is a fundamental concept that is now central to all projects.

Mike Berridge (HRC Senior Research Fellow) Coordinates projects and maintains the profile of the programme. Injects ideas and enthusiasm into young and susceptible minds and encourages their cellular and intracellular germination. Maintains an enviable level of dexterity with macroinjection equipment but is wanting with microinjection. Encourages students to believe that they can control the activity of their glucose transporters, with a little effort and help from growth factors.

Craig Hilton (teetering on the brink of a PhD) Has become a molecular biology jockey and knows no mutagenesis boundaries. Attempts to understand how receptors communicate with signalling machinery within the cell and holds great hopes that cancer can be solved by the weedkiller model. Lives his life accordingly believing that too much is better than too little. Hopes eventually to return to Dunedin and sort out wayward colleagues after having climbed his scientific Everest.

Nuzhat Ahmed (Postdoc) Joined the group last year. Practised a little personal growth factor biology by producing a child and was back in the lab in record time. The only person known to be able to physically complete an experiment before starting it. In discovering that oncogenes activate glucose transporters, she also learned unexpectedly that transporters act like heat shock proteins, and would advise caution on the use of temperature-sensitive oncogenes in glucose transporter studies. Supports the weedkiller model of cancer having shown that growth factors kill some oncogene-transformed cells.

Wang Rui (Professorial Research Fellow from Beijing) Is on a rapid learning curve with English, PCR and cell culture. Is developing PCR methods for mycoplasma screening and will study bioreductive microsomal enzymes involved in cancer drug activation and tetrazolium salt reduction.

An Tan (Research Officer) Mainstay of the research team. Could better Murray Goodall in raising financial resources for cancer research if let loose on the stock market. Grows cells with the same ease that he returns profits on the markets and on plates. Lately has become interested in producing superoxide by activating neutrophils for profit, and has shown that glucose transporter activation is involved. Has thus become a *de facto* member of the Oxidative Stress Research Theme of the University of Otago. An expert K_m and V_{max}-finder by various routes, mostly legitimate.

Murray Jenkins (Research Assistant) A well known member of Mary's lab (down there) in a past life. Is still trying to get L1 cells to differentiate. It is said that he will finally achieve this in the next life, God willing. Has teamed up with Craig, cutting and pasting receptor mutants into useful vectors and poking them into cells. Hasn't yet obtained ethical permission to use them in gene therapy approaches to enhance his performance on the squash court, but when he does the Finnish family with mutant erythropoietin receptors and enhanced erythropoietin receptor function, and a handful of Olympic medals to their credit should beware.

.....and the Students

Kathy McCoy Has almost as much trouble as Rui with her English. Being born in Canada is a poor excuse. Has become attracted to tarmac science recently and to learning the role of being Malaghan ambassador. Has become a deft hand with a cell cracker and is in the race to prove that glucose transporters are phosphorylated before the molecular biologists get their appendages in the door. Has dangerous leanings towards cellular immunology and a fascination with T-cell costimulator signalling that will need to be immunized against. Has shown anti-endocrinologist tendencies by demonstrating that glucose transporter movement from intracellular membranes cannot explain growth factor activation of glucose transport.

Maya Kansara A latter day student who is into

the cell cycle in a big way. Is second to none in massaging the FACSort into showing what is happening to transporters during the cell cycle. Wants desperately to become Research Director of the Malaghan Institute one day, but has to negotiate the maze of a PhD study first... and then the final barrier. Has charted a new universe in exploring glucose transporter isotypes on haemopoietic cells and has taught Western 'Greenhill' blotting to more souls than she can count.

Jonathan McGillicuddy Wharton Jonathan mixes Serious Party Politics with Science, to say nothing of being the resident Malaghan Music Therapist and Network Surfing consultant. Despite these many vices Jonathan has thrown himself into the race to prove, by newly learned molecular technologies, that glucose transporters are activated by phosphorylation. He has slain potential phosphorylation sites with gay abandon, and is germinating his mutants in toad eggs. Watch out Kathy, the eggs work all night!

Jason Erangi Gush Another student of the new age of molecular biology, Jason has his own politics and is pursuing the hot topic of insulin activation of glucose transport. He spent the best part of 6 months discovering that all is not what it seems in science and that molecular clones from top labs sometimes slip into the wrong vectors. He has now made the mutant that may make him famous, and will explore its regulation in toad eggs. Jason is also coupling cytokine receptor mutants with other transporters in toad eggs to investigate whether growth factors activate glucose transporters. He says they do.

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Iron uptake and pathogenicity of *Pseudomonas aeruginosa*.

Department of Biochemistry

University of Otago

Group leader: Iain Lamont.

Other current members, in alphabetical order: David Ackerley, Heather Cunliffe, Ellen James, Brendan McMorran, Jeremy Rae, Amanda Tricker and Megan Wilson.

Honorary member: Sarah Porteous

Background. *P.seudomonas aeruginosa* is a Gram negative bacterium which can be isolated from a very wide range of environments. It has been the subject of extensive research largely because of its ability to infect patients who are immunocompromised as a consequence of various conditions (leukaemia, severe burns, cystic fibrosis, AIDS etc.) although it can also infect animals and plants. During infection, the bacteria secrete a number of agents collectively known as virulence factors which contribute to the pathogenic process. Most of these are proteins, including toxins, proteases and phospholipases. However, the bacteria also secrete a yellow-green fluorescent compound called pyoverdine. This is a chelating agent which can acquire iron from host iron-binding proteins; the ferri-pyoverdine complexes are then taken up by a receptor protein on the surface of the bacterial cells and the iron is released for incorporation into bacterial proteins. Mutant bacteria which fail to make pyoverdine have greatly reduced pathogenicity in animal models of infection, presumably because they are unable to acquire the iron ions which they require for growth. The pyoverdine molecule has a molecular weight of about 1450 and recent evidence shows that at least 80 kb of DNA are required for its synthesis, secretion and uptake.

Our group is using a combination of molecular biological, biochemical and genetic approaches to dissect out the pyoverdine system. We cloned our first genes in 1989 and seem to have been sequencing ever since! At present our research is focused particularly on the regulation of expression of genes which are involved in pyoverdine synthesis and on the receptor protein which is responsible for re-entry of the ferri-pyoverdine complexes into the bacteria

Regulation of pyoverdine synthesis genes. Cells of *P. aeruginosa* only make pyoverdine when grown under conditions of iron-starvation. Our early experiments showed that this is because the promoters of genes required for pyoverdine synthesis are not active in iron-rich cells. As part of his PhD project, **Brendan McMorran** has characterized in detail the promoters of a pair of divergent pyoverdine genes. This has allowed the identification of a *cis*-acting site which is essential for promoter function and which is likely to act as a binding site for a transcriptional activator protein. A second site required for maximal promoter activity has also been identified. Between experiments, Brendan "relaxes" by taking part in iron-man contests. **Heather Cunliffe** has been studying a protein which is required for expression of pyoverdine genes. She has recently found that the same pro-

tein is also required for maximal synthesis of several other virulence factors secreted by *P. aeruginosa*. Heather is now writing her PhD thesis although she will still be around after she finishes as she has accepted a position with Mike Eccles in the Cancer Group. A firm believer in the works of Nostradamus, she has come to terms with the knowledge that the world will end in 1999. **Megan Wilson** and **Amanda Tricker** have recently started in the group and are following up aspects of Heather's research. Megan is looking at the effects of overexpression of the regulatory protein on the phenotype of the bacteria and Amanda is working on the identification of a second regulatory protein.

The ferri-pyoverdine receptor protein. This protein is located on the surface of *P. aeruginosa* cells and is required for uptake of ferri-pyoverdine by the bacteria. We cloned and sequenced the gene which encodes it about three years ago, as well as constructing and characterising bacteria which lack this protein. The research is now moving towards understanding the structure of the protein. As part of her PhD project **Ellen James** has cloned the equivalent gene from a different *P. aeruginosa* isolate; comparison of the sequences of the two proteins should reveal parts which can be altered without affecting the function of the protein. She is also planning to carry out an extensive mutagenic study to characterize the protein. Frequently to be found in the lab saying, "It looks like *Pseudomonas*....and it smells like *Pseudomonas*...." (But does it taste like *Pseudomonas* Ellen?) **Iain Lamont** spent 1994 on study leave in Bath, England using chemically-synthesised peptides and bacteriophage display (a sort of molecular biological monoclonal antibody system) to prepare antibodies which recognize single epitopes of the FpvA protein. These will be used to study the organization of the protein in the outer membrane of the bacteria. A native of Edinburgh, he lives in the vain hope that he will one day be told a Scottish joke that is funny. A Post-Doc from Finland, **Susanna Muttilainen**, is arriving in November to work on the structure of the receptor protein and a technician (to be appointed) will also be involved in this project.

Other aspects. David Ackerley has recently begun a PhD, looking at an enzyme which is required for the incorporation of two amino acids into pyoverdine. The aim is to manipulate this enzyme with the intention of incorporating different amino acids. A keen bridge player, David was a member of the New Zealand youth team which was runner up in the World Championship in July this year. **Jeremy Rae** is at the other end of the PhD process and will soon be writing up his thesis. He has been studying the genes which encode pyruvate dehydrogenase, a key metabolic enzyme. When not in the lab, Jeremy is frequently to be found peppering the bulls eyes at the local rifle club or out in the fields, reducing the local rabbit population.

Honorary member. Sarah Porteous is carrying out a PhD project working on the immune response of sheep to the sheep louse *Bovicola ovis* - you may have seen adverts on TV for sprays to kill this beast. The aim of her project is to clone and characterize louse genes which encode proteins involved in the sheep immune response to the louse. This is a joint research project, in conjunction with AgResearch at Wallaceville where Sarah has been spending the last 18 months. She will be returning to Otago very shortly and we look forward to a new collection of louse-y jokes.

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Computer Corner

The World Wide Web (WWW) has proved to be a spectacular success. Most people who use it find it intuitive in its approach and are rapidly able to find things of interest to them. Randomly surfing the net is very enjoyable and throws up some surprising things. The downloading of large files often follows the finding of an interesting site, and is one of the reasons that the University of Otago has restricted network access. More difficult perhaps, is trying to find something specific, particularly sites that have useful tools or databases.

General Web Searching

When you first start your Web browser (I am assuming you are using Netscape) you will see somewhere a reference to Net Search and Net Directory. Net Search is a page where a number of search engines are located which you can use to identify some possible sites. Careful choice of your search "string" is important here as you are likely to find either that there are too many entries or none at all. None of the searches here are guaranteed to be exhaustive but they will usually throw up something of interest.

Net Directory points to Yahoo and other directories which have Web sites classified in some useful order. These are well worth looking at, especially for things which are new to you. These are really indexes of indexes and contain little

information themselves but can be immensely useful in finding something on a general topic.

Some Useful URL's

A URL (uniform resource locator) is the address by which a site is known. These can be used to get to a site and are often distributed in newsletters, email messages and text documents. To open a specified URL, choose the Open Location item from the File menu. The addresses have a number of parts depending on what kind of site is specified, but as always, accuracy is essential.

One particularly useful URL is "Pedros Research Tools" which can be found at http://www.public.iastate.edu/~pedro/research_tools.html (all one word). This site has a tremendous collection of tools for doing searches of various kinds. It is well worth a look

Using Bookmarks

Once you have found a site that seems to be useful how do you short-circuit the process by which you arrived there? Add the site to your bookmarks. Under the Bookmarks item at the top of the page there is an Add Bookmark item. If you choose this, the item will be added to your bookmarks. To go to a bookmark item, select it from the Bookmark menu. You can edit your bookmarks if you want to tidy them up. Sometimes the names of the sites are not obvious, and can be improved by judicious editing.

Craig Marshall

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Meetings and Visitors

Yeast Meeting

This is scheduled for Saturday 7 October. This will be an ooportunity to catch up on the latest with respect to the use of yeasts in molecular biology to solve both yeast and non-yeast problems. We are fortunate to have a large pool of expertise in the Centre who will be contributing to this meeting and we are pleased to have two visitors also involved: Yoshi Nakamura from Japan and David Perlin from New York. A tentative programme is enclosed on page 9. There is no registration fee and lunch will be provided. This meeting is being sponsored in part by Sci-Tech (NZ) Ltd.

We hope that members of the Centre from outside Dunedin along with anyone with an interest in this field will join us for the meeting. We will be happy to arrange accommodation for anyone who needs it over that weekend. Please call Brian Monk ((03) 479 7099 or email: eobatp@rivendell.otago.ac.nz).

Visit of Dr Julian Rood

Dr Julian Rood (Monash University) will be giving a special seminar sponsored by the Centre on: *Molecular Genetic and Functional Analysis of Tn4451 from Clostridum perfringens*

[this unusual transposon encodes two site-specific recombinases and transposes via the formation of a circular non-replicating form]

Time 4:00pm Thursday 31 August 1995

venue: 4th floor seminar room Microbiology Building

Julian's visit to Dunedin is sponsored by the Centre. He will also be giving two talks to the Microbiology Society meeting.

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