

REPORT OF THE VISITING GROUP TO THE ROSLIN INSTITUTE

11-14 OCTOBER 2005

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WHOLE INSTITUTE ASSESSMENT

SUMMARY ASSESSMENT

1. The VG agreed that there was a continued need for research on farm animal genetics and genomics in an institute framework. The VG recognised the high quality of the majority of the work at RI and its unique position in the UK science base. The work of the institute was addressing many of the strategic priorities of the BBSRC, and the VG recognised the good leverage obtained from BBSRC funding in underpinning more applied studies, meeting the needs of government sponsors and the needs of industry. RI had a core of distinctive expertise in classical genetics, a unique combination of human, animal and other resources, and ran ARK-Genomics, a UK facility which required an institute setting.
2. RI was providing leadership at a European level in driving genome sequencing programmes of livestock species; the institute had recognised strengths in quantitative genetics, conserving genetic diversity, and in large animal transgenics.
3. The VG was satisfied that there was significant added value achieved from carrying the work out in an institute environment. Much of the work needed to take a long-term view and was making effective use of facilities for large animal research which would not be readily available elsewhere.
4. The VG unanimously commended the commitment and leadership of the director through what had been a difficult period for the institute.

Recommendation 1

The VG endorsed the continued need for focused research on farm animal genetics and genomics in an institute framework. The work at Roslin was addressing key priorities of the BBSRC, as well as of government and industry sponsors, and the institute provided a unique combination of resources and facilities for research in these areas.

5. The VG recognised that the institute was in a period of transition. At the time of the visit the institute was developing plans within the framework of the proposed Edinburgh Bioscience Research Centre (EBRC), which would combine the animal research interests and expertise of other organisations in a new facility. In addition to RI these included the Institute for Animal Health's Neuropathogenesis Unit (IAH-NPU); the Scottish Agricultural College (SAC) and the University of Edinburgh Royal (Dick) School of Veterinary Studies (RDSVS). EBRC would also include the Moredun Research Institute (MRI) which would not move to the new site.
6. The VG wished to endorse strongly the concept of EBRC and the potential benefits that this could bring to the institute through increased synergies and efficiencies with the partner organisations, as well as increasing the sustainability

- and resilience of RI. The VG encouraged the partner organisations to drive the development of EBRC forward, including the development of a joint scientific strategy.
7. Informed by the common EBRC scientific strategy, the institute should move quickly to set up further scientific collaborations with EBRC partners in advance of any physical relocation. The VG agreed that the development of EBRC should be a 'process' rather than an 'event' and that there was a need to identify opportunities for synergy sooner rather than later, for example, by developing joint research programmes ahead of any move. The VG also accepted that serendipity would play a role and that it was important not to be too prescriptive in setting out plans.
 8. The VG acknowledged the important contribution that the previous director, the late John Clark, had made in the early stages of the development of these plans.

Recommendation 2

The VG endorsed the concept of the proposed new Edinburgh Bioscience Research Centre (EBRC) which would combine the animal research interests of RI with other partner organisations. The VG encouraged all partner organisations to press ahead with plans for EBRC including the development of joint scientific strategy. Furthermore the VG recommended that the institute, as a matter of urgency, develop further collaborations with EBRC partners in advance of any physical relocation.

9. As part of the transition to EBRC the VG welcomed the strategic refocusing of the institute's mission and organisation to concentrate on research in animal genetics. The revised mission would focus on how genes determine characteristics of cells, animals and populations as applied to livestock breeding, well-being and conservation; biotechnology and biomedicine; and basic science. Since the previous VG in 2001 the institute had withdrawn from animal behaviour, applied animal welfare, nuclear transfer, and avian neuroendocrinology. The VG endorsed the proposal to concentrate on animal as distinct from human embryonic stem cells.
10. The VG supported the director's view that it would be important to increase the depth rather than the breadth of the research programmes, with larger groups, not more. This would increase the resilience and sustainability of the research at the institute. Specifically the VG felt that it would be important to improve the linkage of RI genetic research to a wider range of physiological outcomes. This could be achieved through increased collaboration, including through the EBRC. In addition the institute should seek to increase critical mass within programmes with carefully targeted recruitment.

Recommendation 3

The VG endorsed the strategic refocusing of the institute and the future proposals for the institute to concentrate on animal genetics and its application in livestock improvement, welfare and conservation; biotechnology and biomedicine and basic science.

Recommendation 4

The VG agreed that it would be important to increase the intellectual depth of the research programmes, with larger rather than more groups, and recommended that improved linkage of RI genetics research to a wider range of physiological outcomes be developed through collaboration and, where appropriate, carefully targeted recruitment. This approach, together with the development of the EBRC, would be critical for the scientific sustainability of the institute.

11. The institute was maintaining a broad portfolio of research sponsored by a diverse range of funders including BBSRC, Defra, other Government bodies and industry. As a result there were different drivers for research and the VG felt that the institute needed to ensure that the appropriate balance between high-quality fundamental research and applied research was not lost. With a few exceptions, the VG noted that overall, the quality and impact of publications was disappointing and in some cases the relationship with industrial sponsors was not optimised. In several cases it appeared that commercial needs drove technology development but that they did not provide sufficient freedom or funding to allow application of the technologies to fundamental problems, rather than *vice versa*. It was not clear to the VG that institute intellectual property (IP) was always being fully exploited. While the institute had developed state-of-the-art technologies, these did not appear to have been fully applied to answering fundamental biological questions to the long-term benefit of the institute. Future planning needed to include a strategy for the academic exploitation of collaborative projects.

Recommendation 5

The VG recognised that the institute was maintaining a very broad portfolio of research meeting a diverse range of requirements. The VG recommended that the balance between basic high-quality science and applied research be managed such that, as well as meeting external funders' needs, new science and technologies could be used to address fundamental biological questions.

Recommendation 6

The VG recommended that the institute develop a formal publication strategy to improve the number and quality of papers produced.

COLLABORATION

12. The institute had well-established links with all the partner organisations in the proposed EBRC and, in the view of the VG, building on these existing

collaborations was essential for the future success of this joint project and the institute's own sustainability. It was understood that there was strong support in principle, for EBRC from both BBSRC (responsible for RI and IAH-NPU) and SEERAD (responsible for MRI and SAC) and that a draft science strategy would be ready before the end of 2005. The VG urged the BBSRC to continue to pursue high level contacts with SEERAD and the University of Edinburgh to ensure a coherent science strategy for EBRC was developed in a timely fashion, which RI could use to develop its own priorities in the wider context (see also Recommendation 2).

13. The VG agreed that EBRC would increase critical intellectual mass in key areas, providing more direct access to expertise in areas such as infectious disease and veterinary medicine. This would help increase depth within existing RI research programmes (see Recommendation 4).
14. The VG strongly supported the areas identified for joint research programmes including: animal breeding (with SAC); genetics of disease resistance (with all partners); foetal development and stress (with RDSVS, SAC, MRI). The VG welcomed the relocation of the foetal development group at SAC to the RI which was due to take place in 2006. EBRC would also share infrastructure such as animal facilities, with consequential financial efficiencies. The VG felt that the institute should maintain the 'Roslin' identity within the new centre as the high international profile of RI was a valuable strength and asset.

Recommendation 7

The proposed new EBRC would increase opportunities for strengthening existing collaborations with partner organisations. The VG supported the proposals for joint research programmes and recommended that these be initiated as a matter of urgency, together with plans to merge resources such as animal facilities, where use of existing resources might lead to increased efficiencies and collaboration. The VG also recommended that the institute maintain the 'Roslin' identity in the new centre as the high profile of RI was clearly a valuable asset.

15. The VG noted examples of effective and productive collaborations both with academic and with industrial partners, across the range of science at the institute. In addition to extensive international academic interactions, over 60 commercial partners were cited.
16. The VG highlighted the role of the ARK-Genomics project - the UK Centre for Functional Genomics and Farm Animals - in promoting further collaborations and contact with potential partner organisations from the UK and overseas. This independent facility managed by RI staff had resulted in over 100 applications for assistance or project applications.
17. The VG felt that the institute should develop closer strategic alliances with other BBSRC-sponsored institutes. The institute already had good relations with the

Institute for Animal Health (IAH) and had begun discussions at a senior level on a joint position statement. The VG urged that these discussions be expanded to develop joint research which more directly linked IAH work on physiological aspects of animal disease with RI genetic outputs. The VG also identified possible synergies with the Babraham Institute (BI) on developmental biology and epigenetics particularly with research programmes in RI's Gene Function and Development Division. The institute should consult other BBSRC-sponsored institutes which had already developed formalised Cross-Institute Programmes (CIPs) about appropriate mechanisms and processes.

Recommendation 8

The VG recommended that the institute develop strategic alliances across the range of relevant activities at the Institute for Animal Health and the Babraham Institute. The institute should consult with other BBSRC-sponsored institutes on best practice in developing such alliances.

STRATEGIC RELEVANCE

18. The VG agreed that most of the RI research programme aligned well with around 50% of the major themes in the BBSRC Strategic Plan 2003-2008, including: genomics and functional genomics goals in the Integrative Biology priority area; and genetics of animal disease in the Sustainable Agriculture priority. Work on genetic modification and developmental systems was relevant to the Healthy Organism priority and, given the institute's extensive interactions with the animal industry, RI's activities were clearly relevant to the BBSRC Bioscience for Industry priority.
19. RI was playing an active role in influencing the development of European and international networks, building on a long tradition of participation and leadership in farm animal genomics programmes. Although the institute was providing leadership in these key areas of its science, the VG gained the impression that in some programmes there was a lack of awareness by the researchers of who the institute's main competitors were. Furthermore the VG felt that, in some cases, the institute needed to develop a greater awareness of the changing priorities of funders and to take more opportunities to inform and influence these.

Recommendation 9

The VG recognised that the institute showed international leadership in many aspects of its work and recommended that it develop and demonstrate its international awareness across all areas of its work. Institute researchers also needed to develop a greater awareness of the changing priorities of funders and work to inform and influence these.

20. The institute's work was in most cases meeting the needs of industrial and other users with most programmes rated as either good or outstanding. However, the relations with industry funders were not, in the view of the VG, always optimised,

possibly having an impact on the quality of the basic science. Although the VG accepted the need for the institute to generate external income it felt that RI should ensure this was done in a way that aligned with the overall institute mission, did not restrict the ability to exploit IP, and provided sufficient financial return (see also Recommendation 5).

21. The VG gained the impression that many collaborations, including those with industry, were driven by individual principal investigators (PIs) and felt that while this was desirable, the institute should also be building appropriate alliances in a more strategic, coordinated way (see also Recommendation 13).
22. As long-term experimental data using large numbers of farm animals was not generally viewed by funders as a cost-effective way of acquiring data, the institute was now heavily dependent on external sources of animal data. The VG was concerned about quality control of the data, obtained for example from the commercial livestock industry, as this was critical to the scientific success of the institute, which needed to improve strategy and arrangements for getting best value from non-experimental data. Researchers needed actively to encourage best practice in data collection by their supporters, including the livestock industry and Defra. New strategies might include, for example, a payment scheme whereby commercial livestock operations are financially compensated for data collection and access.

Recommendation 10

The VG recommended that the institute develop a strategy for getting best value from non-experimental animal data, ensuring its quality for research purposes, and that it be more proactive in developing new approaches through dialogue with sponsors and the livestock industry.

SCIENCE AND SOCIETY

23. ‘Dolly’ had provided a unique opportunity for the institute to engage with the media. RI planned and resourced a media strategy that led to a large amount of very positive coverage, both in the UK and overseas, for which the institute was highly commended by the VG. Institute scientists gave interviews to a wide range of media outlets, resulting in a widespread positive regard for RI among the media community. The institute should capitalise on this relationship in its forward strategy. In the future RI would need to be more proactive in engaging with the media, and the VG felt that this was an area that should be prioritised. Increasing resource allocation to media relations, working more closely with BBSRC’s Swindon Office and building on their existing relationship with the Science Media Centre should help develop a more proactive approach.
24. In the last two years the institute had begun to work with schools, and had had school students and teachers visit the site. Recognising the security issues and the

- problems of managing demand, the institute was commended on these activities which the VG felt were currently undertaken at an appropriate level. The institute recognised the value of face-to-face communication, and the multiplying effects of working with teachers. Using the feedback that RI was already collecting, and building on the current use of local and national networks, would help ensure that activities were effectively targeted and had as great an impact as possible.
25. Many similar organisations were only starting to engage with the social science community and RI was congratulated on its proactivity in this area. This was an example of activities and experiences that could be usefully shared with other BBSRC-sponsored institutes to promote best practice. Closer working with other institutes and organisations would also benefit RI, allowing the institute to benchmark its activity in this area with other similar organisations and learn from their experiences. BBSRC's Swindon Office should develop a mechanism to enable the sharing of ideas between institutes.
 26. The institute had already given some thought to its forward strategy. The recognition of this need for a clear strategy in this area was commendable, and the VG looked forward to its delivery. RI would benefit from engaging with all its stakeholders in developing this strategy, to listen to their views and ensure that future activities were appropriately targeted. The range of future activities should include dialogue and more conventional public relations approaches and should also be open to development through effective use of feedback. One mechanism for looking at public opinion was to monitor press reports about RI, which could be done easily and effectively through the Google site (www.google.com/news). Recording and reviewing in that way should be coupled with more direct means of collecting feedback, for example through direct contact and discussion with local groups and schools.
 27. Implementing the new strategy with the level of resources available at the time of the visit would be a challenge. The institute should look to involve as many staff as possible in public engagement activities in order to deliver the strategy. There was already evidence that institute staff enjoyed being involved in these activities, and RI should develop suitable processes and systems so that all staff had opportunities to engage. In the view of the VG, appropriate training and support were key to effective involvement; RI had already made use of BBSRC media training and should ensure that these and other training opportunities were open to staff and that they were actively encouraged to pursue them.
 28. The institute website was specifically mentioned in the forward strategy and in the view of the VG, was in need of review. Gathering information about users and their needs would help with the development of the site. In addition, incorporating interactive elements would both make the website more attractive to visitors and allow for feedback mechanisms.

29. Overall, the VG felt that Roslin was well-placed to build on current activities and its good relationships with the media and looked forward to seeing the successful delivery of the new strategy. The opportunity of the move to the new EBRC site, with a greater critical mass of people, should help in providing some of the expertise and resource necessary to deliver an effective public engagement strategy.

Recommendation 11

RI had so far concentrated on one-way communication. The proposed forward strategy would benefit from effective use of feedback and listening to external perspectives. Building on clear interest from staff, improving support for involving a wider range of staff in public engagement at an appropriate level would be necessary to deliver their forward strategy. The VG recommended that RI benchmark its activities against other BBSRC-sponsored institutes and related organisations. The VG looked forward to a revised website and increased proactive media activity and believed that these were of considerable importance

STUDENTSHIPS AND FELLOWSHIPS TRAINING (SFT)

30. The VG fully endorsed the findings of the SFT report. The VG was impressed by the quality and enthusiasm of the students, who appeared to be well supported and engaged with their science. The full report is at Annex 2.
31. The closer interaction which should follow the development of EBRC should bring more opportunities to increase the number of students. In addition, the VG noted RI's significant role in the University of Edinburgh MSc course in Quantitative Genetics and Genome Analysis, as a potential route to attract additional students.

Recommendation 12

The VG recommended that the institute take advantage of the opportunities arising from the development of EBRC to increase the number of students at RI, by building in particular on established links with the University of Edinburgh through RI involvement in a jointly run MSc course.

KNOWLEDGE TRANSFER (KT)

32. The VG endorsed the main conclusions of the KT report commending the good interrelationships in the local region, the strong track record in KT and strong PI links with industry.
33. The VG noted that, until recently, there had been no business development office at RI, and that KT was largely driven by individual PIs, but recognised the contribution that the new Faraday Partnership in Farm Animal Genetics and

Genomics (Genesis Faraday) was playing in enhancing RI's interactions with the animal breeding and health industries. Recently the institute had established, with MRI and IAH, a new business development vehicle, Genecom Ltd, to improve the commercialisation process and sustain and expand the institute's links with industry. The VG welcomed the role for Genecom in professionalising the assessment of institute IP, whilst recognising the continuing importance of PIs remaining alert to commercial opportunities.

Recommendation 13

The VG recognised the value of industrial interactions and welcomed the new mechanisms in place to provide more formal structures for the institute's relationship with industry, and it recommended that the institute continue to develop professional activities in business development and closely monitor their effectiveness.

BUSINESS PLANNING AND ORGANISATION

34. The VG commended the director for managing the institute effectively, through what had been a difficult time, following the death of the previous director. It was understood that the current director had been appointed for a two year period and was due to retire in 2006.
35. The institute science had recently been organised into two divisions (Gene Function and Development, and Genetics and Genomics). The VG endorsed the objective to increase the skills and expertise available to senior management, which had resulted in a restructured senior management team with the controlling Institute Executive Committee (IEC) now comprising the director, the two divisional heads and the new directors of finance and operations. Between them the two new divisions had a total of eight programmes, each with a coordinator and an associated Working Party which contributed to the development of science strategy and identified new scientific opportunities. Final decisions rested with the IEC.
36. The VG was impressed with the quality of the scientific leadership of the two divisions. However the VG noted the variability in quality of leadership at the programme level. It was clear that some programme leaders had more substantial input to the development of science strategy than others.

Recommendation 14

The VG was impressed with the quality of the leadership of the two research divisions at RI, although observed that the quality of leadership at the programme level varied. The VG recommended that to address this issue the institute focus on the personal and professional development of key scientific staff.

37. At the time of the visit there were 19 principal investigators at the institute, and the VG felt that some programmes were below critical mass. There had been a net

loss of posts during the review period and staff losses meant that some programmes were particularly vulnerable and potentially unsustainable. The VG was generally supportive of the needs identified by the director, to grow to around 24-25 research leaders over the next 3-4 years, to improve the overall resilience of the research programmes.

38. The VG also agreed that there was a need for more depth in some key areas to address the scientific challenges that would face the institute in the future. The VG agreed with the four areas that the director had set out as future research challenges: identification of causative mutations in quantitative trait loci (QTL); a systems approach to address complexity; understanding control of cellular differentiation; and realising the potential of transgenic technology. The VG also agreed the need to increase depth rather than breadth, and that this should be accompanied by further focusing of all activities to align with the central mission of the institute. Specifically it supported the decision to focus on the derivation and exploitation of animal, rather than, human embryonic stem (ES) cells. It was also clear that the Farm Animal Genomics programme was primarily providing a service role and should be integrated with related research in a single entity.
39. Although the VG identified key skills shortages in individual programmes, it did not wish to be too prescriptive, in what it understood to be a rapidly developing situation. The decision on the details of where to make new appointments would depend on the development of strategy and potential synergies generated with EBRC partners. The VG did not have sufficient detailed information about other EBRC partners to make any specific recommendations in this respect.

Recommendation 15

The VG recommended that the institute, in line with the development of EBRC and the appointment of a new director, review the range and international competitiveness of programmes currently operating at the institute. The VG agreed that there was a need for greater depth in scientific expertise and for further focusing to align with the institute mission, and that an increase in staff numbers was needed for the institute to meet the challenges it had identified. This should be achieved by a combination of new appointments and through synergies created within EBRC.

40. A number of high profile senior staff had left the institute in recent years leaving RI dependent on the international leadership provided by only a small number of senior staff. The VG also acknowledged that the age profile of the research leaders was high, with a large cohort of staff in their 50s, some of whom may choose to leave the institute under the BBSRC's 'Decade of Retirement', which allowed retirement from age 55. The VG agreed that there was a need for new high-quality appointments, focused on areas of strategic relevance to the institute in which RI could make a distinctive contribution.

Recommendation 16

The VG was concerned that the institute was reliant on a declining number of senior staff, which would leave the institute further exposed, should they leave. The VG supported the director's plans to make new appointments over the next few years to address key scientific strategy requirements and succession planning needs and to ensure the resilience and sustainability of RI's research.

41. The VG accepted that the Governing Council (GC) was providing a source of advice on the development of the institute science strategy, with key individuals making important contributions in specific areas. However, the VG was concerned that the primary role of GC members, as trustees of the institute, should be one of governance. The VG felt that the institute would benefit from consulting more widely, particularly with independent international experts in a formally constituted independent scientific advisory group. This might include some members of the GC, and should meet frequently to review the development of institute science strategy.

Recommendation 17

The VG recommended that the institute consider establishing a clearly constituted, international scientific advisory group, to complement the advice already provided by the Governing Council.

42. The VG commended the institute on the effective leverage it was achieving from comparatively low levels of BBSRC core funding. The institute was generating good levels of external income from a range of sources. At 30% of total funding BBSRC core funding was half that received by some BBSRC-sponsored institutes.

RESEARCH FOOTPRINT

Research footprint assessment summary					
Number of programmes in each assessment category					
BBSRC-funded	High international	Inter-national	High national	National	Unsatisfactory
		2			
Externally-funded	Outstanding	Good	Satisfactory	Unsatisfactory	
		1			
Mixed programmes	High international	Inter-national	High national	National	Unsatisfactory
		3	1	1	
	Outstanding	Good	Satisfactory	Unsatisfactory	
	2	1	2		

Programme

Assessment rating

BBSRC External

Division: Genetics and Genomics

20: Genetics of Host Responses to Infectious Diseases (mixed)

International Good

21: Operational Genetics (external)

- Good

22: Numerical Genetics (BBSRC)

International -

23: Genetics of Complex Traits (mixed)

High National Satisfactory

24: Farm Animal Genomics (BBSRC)

International -

Division: Gene Function and Development

25: Stem Cells and Cellular Differentiation (mixed)

National Satisfactory

26: Genetic Modification (mixed)

International Outstanding

27: Developmental Systems (mixed)

International Outstanding

ANNEX 1: MEMBERSHIP AND ACKNOWLEDGEMENTS

MEMBERSHIP

- i. The Roslin Institute (RI) was reviewed by a Visiting Group (VG) between 11 and 14 October 2005, The Group comprised:

Professor R Freedman (chair)	University of Warwick
Dr N Ambrose	Scottish Executive Environment and Rural Affairs Department
Professor P Andrews	University of Sheffield
Professor M Antoniou	King's College London
Professor J A M van Arendonk	Wageningen Institute of Animal Sciences, Wageningen University
Dr J Burke	Genetix plc
Dr A M Crawford	AgResearch Invermay Agricultural Research Centre, New Zealand
Dr E Cuppen	Netherlands Institute for Developmental Biology, Utrecht
Dr D Garwes	Garwes Associates Ltd
Dr Pinder Gill	Meat and Livestock Commission
Dr K Laughlin	Aviagen Ltd
Professor M Placzek	University of Sheffield
Professor C Potten	EpiStem Ltd
Professor J Samarut	Ecole Normale Supérieure de Lyon
Dr M Tas	Defra
Professor G Vinson	Queen Mary College, University of London

- ii. The Group was joined by additional experts to review the institute's contributions to the Science and Society agenda:

Sir Roland Jackson	The British Association
Wendy Barnaby	Editor, Science and Public Affairs

- iii. The following people attended from BBSRC Office: Professor Nigel Brown; Mr Steve Visscher; Dr Bill Eason; Dr Chris Lees; Dr Clare Nixon; Miss Caroline Dow.

ACKNOWLEDGEMENTS

- iv The VG was most grateful for the welcome and hospitality extended by the director and staff of the institute, who had done much to contribute to the smooth-running of the visit. The VG also appreciated the considerable amount of background work that had been undertaken by the institute in preparation for the visit.

ANNEX 2: REPORT ON STUDENTSHIPS AND FELLOWSHIPS TRAINING ASSESSMENT

BIOTECHNOLOGY AND BIOLOGICAL SCIENCES RESEARCH COUNCIL

2005 INSTITUTE ASSESSMENT EXERCISE

STUDENTSHIPS AND FELLOWSHIPS TRAINING (SFT) ASSESSMENT

VISIT TO THE ROSLIN INSTITUTE: 7 SEPTEMBER 2004

INTRODUCTION

1. The Roslin Institute was visited by a BBSRC Studentships and Fellowships Training (SFT) assessment panel on 7 September 2004. The SFT assessment forms part of the Institute Assessment Exercise (IAE). The SFT panel comprised two members of the Committee on Studentships and Fellowships (CSF): Dr Barrie Ward (KuDos Pharmaceuticals Ltd; chair) and Professor Tony Wilkinson (University of York). The panel was accompanied by staff from BBSRC Swindon Office: Dr Ian Lyne (Head of Postgraduate Training and Fellowships), Dr Tom Loeffler (Postgraduate Training and Awards Branch) and Dr Bill Eason (Evaluation and Policy Unit).
2. The visit was informed by a background paper prepared by the Institute, which provided the basis for a meeting with senior Institute staff with designated responsibilities for postgraduate and postdoctoral training. The panel subsequently met with a group of postgraduate students from Roslin for an informal, free-ranging and confidential discussion about their experiences and expectations of the training provided by the Institute. In addition, the panel viewed examples of laboratory and office accommodation used by students at Roslin, together with some of the site's specialised facilities. At the time of the visit there were no recipients of BBSRC David Phillips postdoctoral fellowships (or equivalent early career fellowships) at Roslin.
3. In assessing its provision of postgraduate training, the panel had regard to Roslin's effectiveness in meeting the requirements of the Joint Statement of the Research Councils Skills Training Requirements for Research Students (http://www.bbsrc.ac.uk/funding/training/skill_train_req.html) including:
 - Research skills and techniques
 - Research environment
 - Research management
 - Personal effectiveness
 - Communication skills
 - Networking and team working
 - Career management

In making their assessments the panel considered a range of factors which contribute to the delivery of the requirements set out above, including the

environment and facilities; links with universities; supervisory practice; generic training and pastoral care and the student community.

4. The panel provided an overall assessment in three key areas:
 - provision of research-based training
 - provision of generic non research-based, training
 - the quality of the training environment
5. Each aspect was assigned to one of three broad categories
 - (i) good
 - (ii) adequate
 - (iii) unsatisfactory

PROVISION OF RESEARCH-BASED TRAINING

Overall rating: Good

6. The panel noted that the Roslin Institute, as one of the world's leading centres for work in animal genetics, provided a unique environment for the 24 postgraduate students based there to carry out their studies. It benefited from established links with the Faculty of Science and Engineering at the University of Edinburgh, where most students were registered, and with the biotech industrial sector, through a number of CASE studentships.
7. Central to the smooth running and coordination of student training, monitoring and assessment was the role of the Post Graduate Student Committee (PGSC), and the leadership provided by the Postgraduate Studies coordinator. Arrangements for postgraduate training had recently been overhauled, and the changes were still becoming embedded, so that the benefits were being experienced by PhD students in their first and second year. Many positive developments had been initiated by the PGSC and there was evidence that the Institute had directed additional resources to postgraduate training. The panel was impressed by the range of training offered and by the competent way student training policy was now being implemented. The active involvement of student representatives (from each cohort year) was evidence of a genuine participatory approach which was of benefit to both students and to the Institute. It was clear that students felt confident about taking any issues regarding their training that were concerning them to the PGSC. Further development of the current policy and arrangements was likely to lead to further improvements in the training received by students at the Institute. In particular, PGSC structure and membership, which were fundamental to the future success of student training at Roslin, potentially represented a model of good practice which other institutes might wish to follow.
8. The panel was impressed that the Institute student training policy (developed in the Code of Practice for PhD Students Training, tabled at the meeting) applied to all students, regardless of their source of funding or the university they were registered at. Of particular note was the comprehensive approach to

student monitoring and progression. In addition the panel was impressed with the clear guidelines set out for the selection and training of supervisors. Training in supervision was compulsory for all new supervisors, and all existing supervisors were required to attend a training workshop at the University of Edinburgh on a five-year cycle. The panel welcomed the introduction and use of procedures to remove or suspend staff from supervisory roles who, in the opinion of the PGSC, were not meeting acceptable standards of student supervision. Furthermore supervision of students formed part of the annual staff Performance and Personal Development Review (PPDR) assessment for Institute supervisors.

9. There was clear evidence of a comprehensive, coordinated and well- resourced training programme based at the Institute. Some training was mandatory for all students. It was clear that most students were receiving excellent levels of support from their supervisors as well as from post-docs and others working in the laboratories. Student training activity was now being recorded on a new database, which was reviewed by the PGSC. This database also recorded student progression targets and supervisor training. These arrangements were too recent for the panel to assess their effectiveness but, if implemented as intended, were likely to enhance the effectiveness and quality of PhD training at Roslin.
10. Roslin was an Associated Institute of Edinburgh University and most students were registered there. There was also a jointly run MSc course. The new arrangements for student training were also driven by the requirements of Edinburgh University. The panel recognised however that the geographical location of the Institute presented a potential barrier to closer association with the University, which inevitably had some impact on academic and social links. However, the panel felt that greater interaction between students and the University should be actively encouraged, to enable students to take more advantage of the excellent research and training opportunities offered by the combination of the Institute and the University. For example, attendance at University-based seminars and lectures should be facilitated by improved coordination of transport to and from the Institute. Student contact time with their University supervisors appeared to vary considerably, and a more structured approach to this should be adopted, including students spending more prolonged periods working in University laboratories to broaden their research and other skills. For students registered at universities other than Edinburgh, urgent consideration should be given to clarifying support arrangements and responsibilities, both at the University of registration and at Edinburgh University. However it was also recognised that much of this had to be left to the initiative of individual students and supervisors.
11. Recruitment was reported as a problem for some projects. Unlike a University-based research unit, there was no steady flow of undergraduates to recruit from. Efforts had been made to recruit more effectively (such as targeting biotech departments in selected universities and advertising more widely) but with variable success. In some cases studentship vacancies had not been filled. There was a particular problem in recruiting in quantitative genomics projects where there was strong competition for suitably qualified students. The panel

felt that additional effort should be made to promote Roslin Institute as a place for PhD research, including for example organising visits by Edinburgh-based undergraduates to the Institute. Greater effort on recruitment should contribute to meeting the Institute's aspiration to increase overall student numbers.

12. There was strong support both from Institute staff and from students for the proposed Doctoral Training Accounts. These would provide more flexible funding of studentships lasting up to four years, allowing additional advanced training, placements, or more ambitious projects as appropriate.
13. There was evidence of good collaboration with key industrial partners in student training, primarily through the CASE scheme. Whilst recognising the inherent difficulties in establishing such links, particularly with the relatively volatile biotech sector, the panel felt that more effort should be made to foster such links and increase the number of studentships supported by industry. There was a need to further raise awareness amongst all students about potential career options in the private sector.

PROVISION OF GENERIC NON RESEARCH-BASED TRAINING

Overall Rating: Adequate

14. Most students recognised the need for key transferable skills training. This was obtained by the Transkills programme arranged through the University of Edinburgh and through access to various BBSRC courses. BBSRC courses in presentation and writing skills were singled out for praise by the students. Those who had attended a UK GRAD School residential training course recommended this to fellow students.
15. The panel was impressed that each student was allocated a statistician who they could consult about the design and analysis of their experimental work. Whilst some students recognised the importance of seeking this kind of advice from the outset of their research, more should be done to promote communication between statisticians and students, particularly at the early design stages of their research, not just in data analysis.
16. The students were principally reliant on the careers advice available at the University although it was not clear how many of the students were aware of this service or had used it. The development of more effective links with the University (raised in relation to research-based training) would also help improve awareness, access and utilisation of this kind of help for students considering their options after they completed their studies. More careers information should be provided by the Institute as well, for example, in induction packs and at key stages in the PhD cycle (e.g. at the end of the second year). Improved links with the local biotech sector would also raise overall awareness of career opportunities in the private sector. Career open days (possibly coordinated with the University) where local biotech companies were invited should also be encouraged.

THE QUALITY OF THE TRAINING ENVIRONMENT

Overall Rating: Good

17. Students based at Roslin had access to the range of facilities offered by both the Institute and the University. There were no reported problems with access to equipment. Students had access to Institute-based equipment that might not be available to most University-based students (e.g. extensive microarray/sequencing facilities within ARK-Genomics). The students also benefited from the unique animal facilities and resources at the Institute. Laboratory-based students were allocated £6000 p.a. for consumables and, from the examples seen, had been given adequate bench space.
18. Students shared office space and in some cases computers, but most students had access to their own dedicated machines, and access to computing equipment generally appeared to be satisfactory. Following a proposal from the student representatives on the PGSC a number of quiet rooms had been set aside (equipped with computer equipment) for writing. Some concern however was expressed that students working in quantitative genetics, who had a much lower consumables allocation (currently £1000 p.a.) than laboratory-based students, did not have access to the best or most appropriate computer equipment (e.g. faster processors and flat screen monitors for example). Although such equipment was upgraded along with all other computer equipment on site on a three-year cycle, it was felt that given the importance of computer equipment in this area of research, greater priority should be given to upgrading computer equipment either more frequently or to a higher standard.

GENERAL COMMENTS

19. Students at Roslin clearly benefited from access to unique resources and facilities available at the Institute. The overhauled PGSC, under the leadership present at the time of the visit, had put in place a range of measures which, if effectively implemented, would result in further improvements in quality and consistency in student training. Improvements beyond this would inevitably be limited, however, if more effective links with the University were not developed. The Institute may wish to keep under review the services provided by the Universities at which its students were registered, in view of the full tuition fee paid to the University as part of a BBSRC studentship.

SUMMARY OF RECOMMENDATIONS

Recommendation 1

The current Post Graduate Student Committee (PGSC) structure and membership, which were fundamental to the future success of student training at Roslin, potentially represented a model of good practice, which other institutes might follow.

Recommendation 2

Greater interaction between students at Roslin and the University of Edinburgh should actively be supported, to enable students to take more advantage of the excellent research and training opportunities offered by the combination of the Institute and the University.

Recommendation 3

For students registered at universities other than Edinburgh, urgent consideration should be given to clarifying support arrangements and responsibilities, both at the University of registration and at Edinburgh University.

Recommendation 4

Additional effort should be made to promote Roslin Institute as a place for PhD research, including for example organising visits by Edinburgh-based undergraduates to the Institute.

Recommendation 5

More effort should be made to foster and increase the number of studentships supported by industry.

Recommendation 6

More should be done to promote communication between statisticians and students, particularly at the early design stages of their research, not just in data analysis.

Recommendation 7

More careers information should be provided by the Institute. There was a need to further raise awareness amongst all students about potential career options in the private sector.

Recommendation 8

For students working in quantitative genetics greater priority should be given to upgrading computing equipment either more frequently or to a higher standard.

The following documents were tabled at the meeting:

Code of Practice for Training of PhD students

Booklet: PhD Studies at Roslin Institute

Securing Studentships

Guidelines for 10-week PhD reports

Thesis Plan Guidelines

What the Supervisor expects from their Student

What the Student can expect from their Supervisor

College of Medicine and Veterinary Medicine: Assessment of PhD and MPhil students following prescribed period of probationary training (University of Edinburgh document)

Blank student record form

