MEDIA RELEASE

KOALA GENOME PROJECT
Saving Koalas
A world-first mapping of the Koala genome

Tuesday April 9, 2013. Today, Australian Museum Director, Mr. Frank Howarth PSM, announced that a consortium of Australian scientists led by Dr Rebecca Johnson of the Museum and Professor Peter Timms of the Queensland University of Technology (QUT) has achieved a world-first major breakthrough by completing an initial sequencing of the koala genome – the genetic blueprint for koalas.

Mr. Howarth congratulated the scientists working on this landmark achievement, which promises to lead to a new understanding of koala biology, transform how we study and manage them, as well as new ways to diagnose and treat the diseases affecting Australia’s iconic koala.

"Prior to this ground-breaking study, virtually nothing was known about the immune system of Australia’s ‘honorary citizens.’ For the first time, we now have an insight into how and why the two major diseases threatening the koala, Chlamydia and Koala retrovirus (KoRV), have had such a devastating effect on our iconic native species,” Mr. Howarth said at today’s launch of the Koala Genome Consortium.

QUT’s Professor Timms said part of the data is helping researchers understand why Queensland and New South Wales koala populations have been crippled by the spread of Chlamydia while Victorian populations remain virtually unaffected. Clinical disease and some do not.”

"We know that koalas are infected with various strains of Chlamydia, but we do not know why some animals go on to get severe clinical disease and some do not," Professor Timms explained.

Scientists at the Australian Museum and QUT have already discovered over twelve thousand Koala genes including the Koala interferon gamma (IFN-g) gene - a chemical messenger that plays a key role in the marsupials defence against cancer, viruses and intracellular bacteria.

QUT scientist Dr. Adam Polkinghorne said “This finding promises to benefit gene discovery and the development of immunological tools that will also help us fight diseases in our other threatened and endangered wildlife species.”

Importantly, this research also revealed that the majority of koala genomic sequences shared similarities to that of the Tasmanian Devil, showcasing that comparisons of the immune genes of marsupials will provide insights into how they combat disease.

Dr Rebecca Johnson from the Australian Museum’s Australian Centre for Wildlife Genomics said, “Analysis of this huge data set is already revealing the complete repertoire of koala genes, with more

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than 12,000 identified so far. This fantastic resource opens the way to exciting new research possibilities incorporating the rich collection of historic samples housed in Natural History Museums around the world. The thousands of new genetic markers in this genomic data will allow the Museum to analyse the genetic structure of koala populations at a level of detail comparable to most human forensic analyses, and this will be a major focus of our future work.

Mr Howarth said “The Australian Museum plays an important role in advising government and industry on population genetic health of many native Australian animals, and for over a decade has been providing advice based on population genetic data for some NSW koala populations. Today’s announcement represents a major advance in saving the NSW and Queensland koalas from these terrible diseases and securing the future for this iconic species.”

While the consortium leading the project already contains more than 12 scientists, veterinarians and bioinformaticians, the team have only just embarked on this voyage of discovery. Australian and International experts will now be invited to participate in a larger new Koala Genome Consortium which will supplement existing national and international koala research programs. To ensure this sea of data is fully utilized and have real world outcomes an additional $5 million of funding will need to be sourced over the next 5 years.

Mr. Howarth acknowledged and thanked existing funders: the Australian Museum Foundation, Bioplatforms Australia, QUT and the ARC Linkage Scheme as well as UNSW’s Ramaciotti Centre for library preparation, sequencing and outstanding technical expertise.

Professor Timms pointed out that “Funding to date has resulted in a rich koala genetic bank. However, we require more help to fully explore and analyse the data to ensure the continued survival of this iconic species.” To improve the completeness and accuracy of the genome sequence this project requires an additional $5 million of funding to cover the laboratory and bioinformatic costs of completing the first draft of the genome. This will lead to substantial flow-on benefits to the broader koala and scientific community.

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The Australian Museum Mammal Collection

The Australian Museum Mammal collection was formed in the mid 1800s and has grown to become one of the most comprehensive collections of Australasian mammals in the world. It currently contains approximately 48,000 specimens from over 100 different countries.

The majority of specimens, approximately 24,000, are from Australia, with a further 10,000 from Papua New Guinea, 2, 700 from Indonesia and 2, 300 from the Solomon Islands. The two largest groups represented are Bats (16,500 specimens) and rodents (9,500). Specimens come from a range of sources including; early collectors and explorers, museum staff, donations from universities and the public, government environmental agencies, zoos and exchanges with other museums.

The mammal collection consists of study skins, mounted skins, skeletons, skulls, teeth, spirit preserved whole specimens and organs. There is also an extensive collection of over 10,000 frozen or ethanol preserved tissues samples from a diverse range of mammals from the Australian-Pacific region.

Many specimens in the collection have great historical as well as scientific value having formed the basis of the original description of a particular species when it was first named. There are over 570 of these specimens known as “type” specimens in the collection including the only known specimens of a number of species. There are also more than 100 specimens of recently extinct species like the Lesser Bilby, *Macrotis leucura* and Thylacine, *Thylacinus cynocephalus*.

The Koala collection

The Australian Museum Koala collection currently comprises over 290 specimens dating from the late 1870s. There are over 100 skins, 130 skulls and approximately 50 spirit preserved specimens in the collection which are available to researchers both within Australia and overseas. Many of the early specimens are ex captives from Zoos. More recently, specimens are received after they have been found dead on the road or euthanased due to severe injuries or disease.

One of the most important specimens is the “type” specimen of a Koala subspecies from Victoria, *Phascolarctos cinereus victor*, described in 1935 by the museum’s mammal curator at the time, Ellis Troughton. Other significant specimens in the collection include those donated in the 1950s from the now endangered population on Barrenjoey Peninsula in Sydney’s north.

The Koala collection has formed the basis of a number of recent research projects. DNA extracted from historical specimens from the late 1800s and early 1900s was used to examine the origins and evolution of retroviruses which increase Koala’s susceptibility to infections such as Chlamydia. Specimens used in the Koala genome sequencing project are also lodged in the collection.
A.7339 mount (registered 1879 ex captive Botanic Gardens)
M.5732 Skull (Type specimen of P. c. victor, registered 1934 from Booral)

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M.6583 mount (some damage; registered 1939 ex captive)
M.33805 Phascolarctos (registered 1998 from Woodburn used in external exhibitions)
M.33805 Phascolarctos 1 (registered 1998 from Woodburn used in external exhibitions)
Old mount and flat skin

Skeletal material boxes
Spirits

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Skins and Mounts

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