



Prize Winner

**Science Writing
Year 3-4**

Ellie Girgolas

Loreto College



Oliphant Science Awards 2024

Science Writing

Topic: The Science in Traditional First Nations Medicines

By Ellie Girgolas - Year 4 - Loreto College Marryatville

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Welcome to the First Nations Pharmacy!

My name is Pharmacist*¹ Ellie, and I am going on a journey through the science of First Nations medicines.

We go to pharmacies every day. But did you know that there is a pharmacy all around you? You just have to know what to look for and understand the science behind it!

For this journey, my focus is First Nations medicines from Kurna Yerta (the Adelaide plains), which is home to the original custodians (and original pharmacists) of the land, the Kurna people.

I will also be looking at the examples of traditional medicine from the Tiwi Islands² and interview a pharmacist (a real one – not me!) about the science behind these medicines.

Follow me to the pharmacy – in your backyard!



Image 1: Me at my local park where I discovered the medicines I will talk about in this report.

¹ *I'm not a *real* pharmacist – yet... ©

² The Tiwi Islands are part of the Northern Territory, Australia, 80 km north of Darwin [Tiwi Islands travel information | Northern Territory, Australia](#). I interviewed a Tiwi Island Elder Maralampuwi Kurruwu (Francis) and the interview and all photos in Appendix 1 and in this project are used with permission from Mr Rioli and Francis.

First stop in the First Nations Pharmacy is...

Prescription# 1: PIGFACE

Kaurna name – Karkalla

Scientific name: *Carpobrotus rossii*

Have you seen this plant before?



Image 2: Pigface/Karkalla (in bloom) at a beach

Source: [Pigface | Carpobrotus rossii - Native Plant Project](#)

Do you know it is medicine? Let me explain...



Image 3: Images of me with Pigface/Karkalla (not in bloom) in my local park.

Pigface/Karkalla is used by First Nations people to treat inflammation. Inflammation is a normal response to ‘invaders’ in your body³ (like a virus, bacteria, bite or an injury). Inflammation can promote healing and make you feel better. I interviewed my pharmacist, Louise Rowland (Image 4) and she explained that when skin is attacked, the body releases chemicals from within its cells that leads to inflammation at the injury site. Substances called cytokines “turn on” the cells involved in inflammation – part of the body’s natural defences.



Image 4: Me interviewing my local pharmacist Louise

3. [What Is Inflammation? Types, Causes & Treatment \(clevelandclinic.org\)](#)

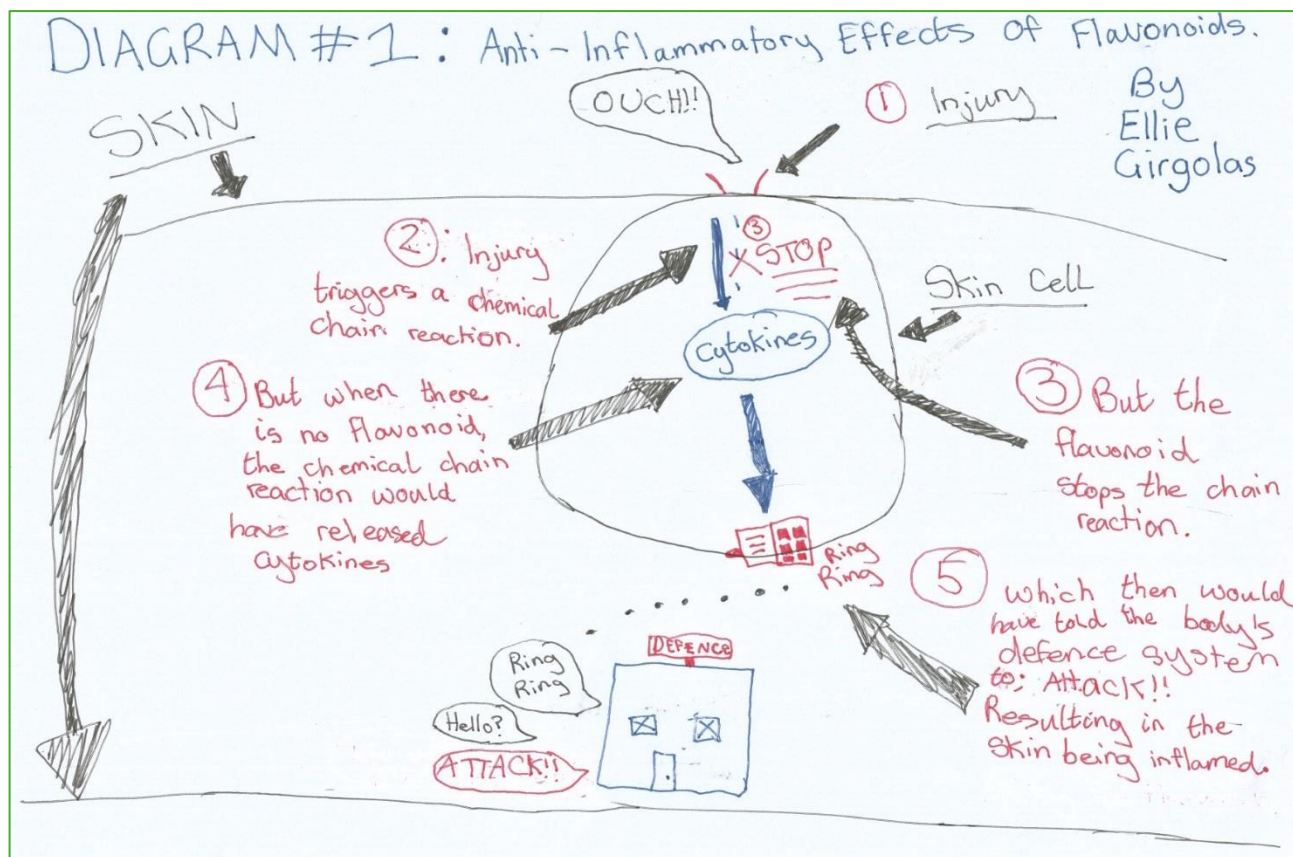
These cytokines work to try and help protect the body from the injury/bite by activating special cells called “neutrophils, macrophages, and mast cells”⁴, which are all cells that protect the body by killing the attacking cells as part of the body’s inflammatory response.⁵

So, what is the science behind how Pigface/Karkalla works to stop this inflammation? Through my research and interview, I found that Pigface/Karkalla belongs to a group of natural substances called flavonoids.⁶ Flavonoids work as an anti-inflammatory in the body by stopping the development and release of cytokines – which “turn on” the inflammatory response.

When the juice of the Pigface/Karkalla (see Image 5) is applied to a bite or injury, the flavonoids contained inside the juice⁷ try to stop a complex chain-reaction from occurring between chemicals in cells after an injury, and this stops the inflammation (see Diagram 1 below).⁸



Image 5: Pigface/Karkalla broken open to show juice inside the plant.



I drew this diagram (Diagram 1) based on information I learned in an interview with pharmacist Louise and from a diagram in an article- Major inflammatory pathways targeted by flavonoids [Flavonoids as Potential Anti-Inflammatory Molecules: A Review - PMC \(nih.gov\)](#).

⁴ Flavonoids as Potential Anti-Inflammatory Molecules: A Review [Molecules](#). 2022 May; 27(9): 2901.

Published online 2022 May 2. [Flavonoids as Potential Anti-Inflammatory Molecules: A Review - PMC \(nih.gov\)](#)

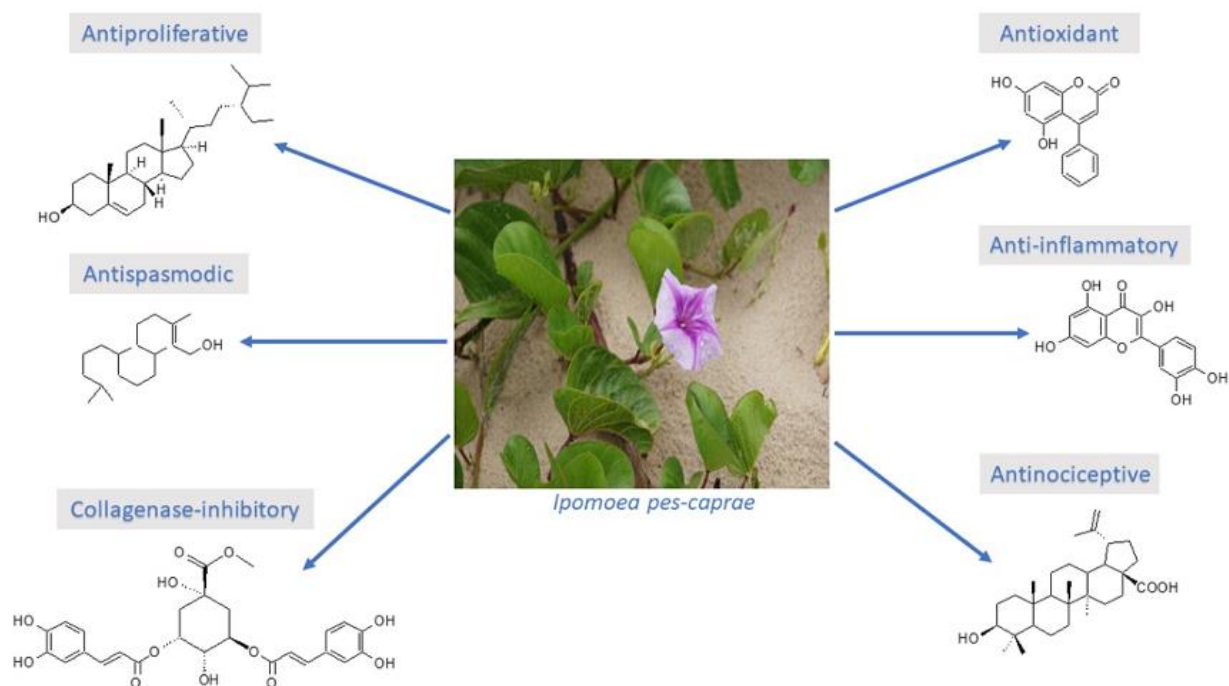
⁵ Interview with Louise Rowland, Pharmacist (B.Pharm, Uni SA)

⁶ [Antioxidants \(Basel\)](#). 2019 Feb; 8(2): 35. Published online 2019 Feb 5 [Potential Role of Flavonoids in Treating Chronic Inflammatory Diseases with a Special Focus on the Anti-Inflammatory Activity of Apigenin - PMC \(nih.gov\)](#)

⁷ [Everything You Need to Know About Flavonoids \(healthline.com\)](#)

⁸ Major inflammatory pathways targeted by flavonoids [Flavonoids as Potential Anti-Inflammatory Molecules: A Review - PMC \(nih.gov\)](#)

Tiwi Island elder Maralampuwi Kurrupuwu (Francis), explained in an interview (see Appendix 1) that in the Tiwi Islands, the rokuni plant (*Ipomoea pes-caprae*), like Pigface/Karkalla, is also used for its anti-inflammatory properties⁹. Francis explained that the leaves of the rokuni are picked and used to treat skin sores such as scabies. Rokuni has many other medicinal benefits (see Image 6 below).



Graphical abstract

Image 6: Medicinal properties of Rokuni (*Ipomoea pes-caprae*) from the Tiwi Islands

Image 6 source: [Marine Drugs | Free Full-Text | A Medicinal Halophyte *Ipomoea pes-caprae* \(Linn.\) R. Br.: A Review of Its Botany, Traditional Uses, Phytochemistry, and Bioactivity \(mdpi.com\)](#)

Explanation of terms: Antiproliferative (stopping cells from multiplying rapidly), antioxidant (protects cells from being damaged), antispasmodic (helps to relax muscles), anti-inflammatory, collagenase-inhibitory (stops collagen breakdown. We need collagen for healthy nails and hair). Antinociceptive properties (blocks pain signals)¹⁰

⁹ [Marine Drugs | Free Full-Text | A Medicinal Halophyte *Ipomoea pes-caprae* \(Linn.\) R. Br.: A Review of Its Botany, Traditional Uses, Phytochemistry, and Bioactivity \(mdpi.com\)](#)

¹⁰ [Medical Terms and Abbreviations: Merriam-Webster Medical Dictionary](#)

Next stop in the First Nations Pharmacy is....

Prescription# 2: IRON BARK

First Nation/Tiwi name: Jimi Jinga

Scientific name: *Eucalyptus sideroxylon*

Eucalyptus might seem like a simple plant, but as First Nations people understand, it is a complex and effective treatment for upper respiratory and other viral infections¹¹. First Nations people (see interview Appendix 1) crush and boil eucalyptus leaves to release the oil (See Images 7.1-7.3). The drained liquid is drunk. The active ingredient in eucalyptus oil is called eucalyptol.¹²



Image 7.1 – Me collecting Eucalyptus leaves in my local park



Image 7.2- Boiling Eucalyptus leaves on the stove



Image 7.3 - Crushing Eucalyptus leaves to release the eucalyptol

When you have a cold, mucus builds up and your throat and airways become inflamed. Like in Pig Face/Karkalla, the eucalyptol stops the cytokines from working. Pharmacist Louise explained that cytokines help reduce mucous creation and how much the muscles in your throat contract, by activating another chemical called acetylcholine (ACh). ACh is a 'neurotransmitter', which means it sends messages between neurons which control the messages from your brain to the muscles¹³. The eucalyptol also helps the muscles in your airways to relax and this can help you breathe easier.



Image 8 (used with permission from Maralampuwi Kurrupuwu (Francis))

Image depicting Ironbark/Jimi Jinga trees in the background, and Jimi Jinga leaves used in a traditional smoking ceremony on the Tiwi Islands

¹¹<https://www.sciencedirect.com/topics/medicine-and-dentistry/eucalyptus-oil>

¹²<https://www.sciencedirect.com/topics/medicine-and-dentistry/eucalyptus-oil>

¹³ [What is Acetylcholine? | Mental Health America \(mhanational.org\)](https://www.mentalhealthamerica.net/what-is-acetylcholine).

Final stop in the First Nations Pharmacy is...

Prescription# 3: WATTLE (GOLDEN WATTLE SEED)

Kaurna name: Mirnu Wirra

Scientific name: *acacia pycnantha*



Image 9: Me with a wattle tree in my local park

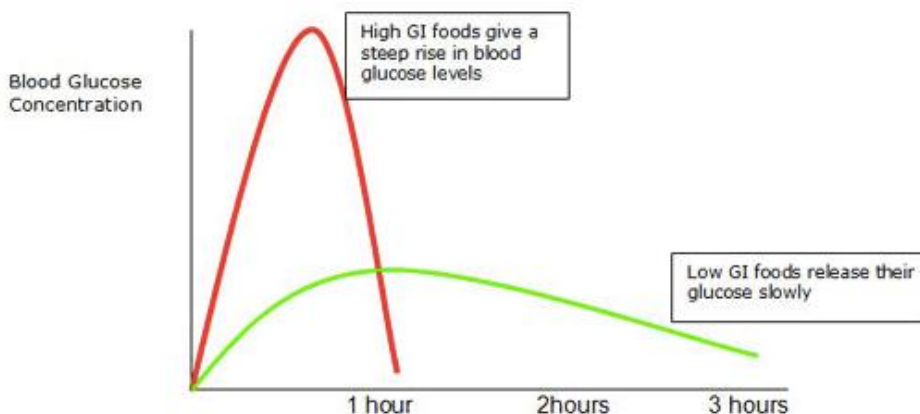


Image 10: Wattle in my local park

Wattle seeds are important to First Nations people because they are nutritious, being high in protein and fat.¹⁴ This means that they have a low glycaemic index (GI) – which is a measure of how quickly the sugars in food are digested and increase the sugar levels in your blood (see Diagram 2).¹⁵ The sugars in the wattle seed are released much slower into the blood stream compared to other seeds and grains.¹⁶ Low GI foods help diabetics control their sugar levels.

Diagram 2 - The effect of high and low GI foods on blood glucose levels

Source: [Low GI/GL \(Glycaemic Index/Glycaemic Load\) Diet - Natural Health Connections](#)



The effect of high and low GI foods on blood glucose levels

¹⁴ According to <https://warndu.com/blogs/first-nations-food-guide/wattleseed> - Wattle seed has protein levels of 18-25%.

¹⁵ <https://www.betterhealth.vic.gov.au/health/healthyiving/carbohydrates-and-the-glycaemic-index>

¹⁶ Catalyst Foundation (2019) *Kaurna Country Traditional Foods Medicines and Remedies* , page 18.

Conclusion

That brings us to the end of our journey and it is only a sample of the First Nations medicines in our backyard. If we are curious enough about our world, we will find that science is all around us, as Sir David Attenborough says - *“It seems to me that the natural world is the greatest source of excitement.”*¹⁷

By Ellie Girgolas

Word count 776 (excluding titles, labels, referencing and footnotes)



Image 11: Image of me taken at Kensington Gardens Reserve – Wama Mukanga, May 2024.

Acknowledgment of Country: I pay my respects to Elders past and present and celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of South Australia and the Tiwi Islands in particular, whose knowledge and wisdom about traditional medicines has been passed on for generations.

¹⁷ [10 best nature quotes from Sir David Attenborough - WWF-Australia](#) | [10 best nature quotes from Sir David Attenborough | WWF Australia](#)

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Interviews

Interview in collaboration with Dr Jack Fuller and Willie Rioli (who is originally from Mevillie Island) and a Traditional Tiwi Elder Maralampuwi Kurrupuwu (Francis, who is from Bathurst Island) May 2024

Interview with Louise Rowland, Pharmacist (B.Pharm, Uni SA) May 2024

ACKNOWLEDGEMENT

I would like to thank my parents for encouraging me as I researched and wrote my science writing. Thank you also for taking me to parks for field research and taking photos of me for my project.

Thank you to Dad for helping me edit my photos and sending my email to Dr Jack and for helping me understand some of the science and understand the research I found when I wasn't sure.

Thank you to Mum for teaching me how to do footnotes and a bibliography, helping me edit my work and for driving me to the park and the pharmacy for my interview.

Thank you also to Dr Jack Fuller, who encouraged me and gave my questions to Mr Rioli and to Francis and helped with the interview process by sending my emails and passing on the answers.

I feel very lucky to have had an Elder talk about their traditional medicines and am very thankful to Mr Rioli and Francis for being so generous with their knowledge.

Thank you to Louise Rowland, my pharmacist, for also being so generous with her time and knowledge and explaining complex science in a way I could understand it.

I am thankful to my school and teachers for encouraging me to enter the Oliphant Science Awards. I have really enjoyed the research and bringing this project together. Even though it was hard work at times and took a lot of time, I am very grateful I kept going.

I have learned so much through this project – about science, how to research and write science projects and about our First Nations people and their medicines.

Ellie Girgolas
Year 4
Loreto College Marryatville

APPENDIX 1

INTERVIEW QUESTIONS AND ANSWERS

For Mr Rioli (and Maralampuwu Kurrupuwu (Francis)) via email 22 May 2024.

The questions below were sent via email 22 May 2024. I told my Doctor, Dr. Jack Fuller about my OSA, and he said he knows Mr Rioli and would be happy to pass on any questions for me. So I emailed Dr Jack – with help from my parents, and Dr Jack emailed me/my Dad, the reply from Mr Rioli and Francis.

Hello Mr Rioli,

My name is Ellie and I'm in Year 4 at Loreto College.

Thank you so much for agreeing to help me with my Oliphant Science Project this year! It really means a lot to have you share your knowledge of your culture with me.

This year for the OSA, we could choose lots of different topics to write about. I chose "First Nations Science" because it is something I am really interested in. Last year we did an Inquiry about First Nations people and I learnt about strong people in Indigenous history, like Vincent Lingiari, Eddie Mabo and Pemulwuy and modern day inspiring First Nations people like Lowitja O'Donoghue. My family is also passionate about First Nations history, and that all lead me to choose First Nations Science as my focus.

One day, I hope to be a doctor or pharmacist, and this inspired me to focus on "The science behind First Nations medicine".

I am going to present my project as an Information Report.

I have found the following in my local park and have done some research on them.

- 1. Pig Face – used for burns, bites, stings and aids in digestion.*
- 2. Wattle Seed – helps with diabetes*
- 3. Red River Gum – cough, colds, sore throats and respiratory infections.*

Questions for Mr Rioli:

I would be very grateful if you could let me know of any other bush medicines you are familiar with and grew up with?

Whilst my focus is Kurna as it's my home, it would be helpful to include any bush medicines used by First Nations people in Australia.

My questions are:

- 1. Where did you grow up? Would you mind telling me a bit about your culture and community?*
- 2. What traditional bush medicines are used on your country?*
- 3. Where can they be found?*
- 4. How were they collected and prepared (if applicable) to use as medicine and by whom?*
- 5. Could you please list these medicines in their traditional name as well as their non-Indigenous name if known.*
- 6. What are these traditional bush medicines used for?*
- 7. What is your understanding of how they work?*

(APPENDIX 1 continued...)

**ANSWERS FROM MR RIOLI AND FRANCIS - received 29 May 2024:
(Sent to me/my Dad via email from Dr Jack Fuller)**

From: **Dr Jack Fuller** <>
Date: Wed, 29 May 2024 at 09:29
Subject: Re: Questions for Willie
To: <>

Please see attachments below for answers to Ellie's questions for her project.

These answers were obtained through a collaboration from Willie Rioli (who is originally from Melville Island) and a Traditional Tiwi Elder Maralampuwi Kurrupuwu (who is from Bathurst Island).

Please see attached photos and pictures to supplement the answers.

We hope this will be of value to Ellie.

Kind Regards,
Jack

Answers for Ellie:

1. Where did you grow up? Would you mind telling me a bit about your culture and community?

My name is Maralampuwi Kurrupuwu. You can call me Francis. I am an elder on the Tiwi Islands. The Tiwi Islands are made up of Bathurst and Melville Island. They are 80 kilometres north of Darwin in the Northern Territory. There are three main communities based on these islands. The largest is Warrumiyanga on Bathurst Island. My family lives on the coast, outside the community.

My name is Willie Rioli. You can call me Willie. My Family and I am from a community at the most northern aspect of Melville Island, called Pirlangimpi. Our community is often referred to as 'Garden Point'.

Around 2 500 Tiwi people live on the two islands. Melville Island is Australia's second largest island, after Tasmania – so, it is quite big!

Please see the attached photo. It is the large island on the right of the photo.



Most people speak Tiwi as their first language and English as their second language.

The Tiwi have a very interesting culture. They have developed their language and culture differently from Aboriginal groups on the mainland as they are separated by the sea. The Tiwi are very interested in art including very colourful, abstract paintings and sculptures of birds and animals.

The art is used to tell stories and linkages with other clans in the communities. When people have died Tiwi people paint their bodies and express their love and concern through music, art and dance. The Tiwi are famous for the totem poles that are carved for the burial ceremonies. These poles are called *Pukumani poles*.

Music is very important to the Tiwi people who sing songs about the land handed down from the old people. They sing songs about their lives, including hunting, cooking, family and animals.

Yiloga (Australian rules football) has become an important part of Tiwi culture and many famous AFL footballers have come from the Tiwi Islands, such as Michael Long and Maurice, Cyril and Willie Rioli.



2. What traditional bush medicines are used on your country?

This is a record of what I have been told by Maralampuwi and Willie.

(APPENDIX 1 continued...)

Jimi Jinga

We collect Eucalyptus leaves from the Iron Bark tree, which we collect in the Bush. We then crush the leaves using stones. Once the oil start to appear we place the leaves in a billy of water and boil the mixture. We then drink the mixture. We find this is very good for colds and if we are having trouble breathing properly. The Tiwi name for this medicine is Jimi Jinga. The Tiwi word for a cold or flu-like illness is Chickaputi.

Kuraka

We collect and crush this cycad palm to collect the nuts. However, without preparation the nuts can be poisonous. So, first we crush the nuts with stones. We then place the crushed nuts in paperbark collected from the paper bark tree. We then place the folded paperbark with the nuts inside in a water spring for three days. After this time, we put the crushed nuts in a basket when we can eat them. They are very good for general health and we find they keep our bodies strong.

Rokuni

These are leaves which we find on plants growing at the beach. We pick them and use them to treat sores on our bodies, such as skin problems, like scabies.

Jikiringini

We also find this plant at the beach and use it to make soap after crushing it. This plant is very good for preventing sores and infections on our bodies.

Yuwurli

This is a long white mangrove worm we find living in old, broken mangrove trees, at the beach at low tide. It is around 15 cm long and tastes like oysters.

We find it is a very good provider of vitamins and keeps us fit and healthy.

Piranga

This is a shell fish that we find amongst the mangroves at low tide. It is a very good source of protein and are low in bad fats. They also keep us fit and healthy.

Most of the collecting of these bush medicines is done by the women, who are very good at finding them. Men will help at times. Men are usually more involved in hunting for wallabies and fishing.



End of interview answers

APPENDIX 2

SOME IMAGES OF MY FIELD TRIPS TO FIND SAMPLES OF FIRST NATIONS MEDICINES IN MY LOCAL AREA & MAKING MY SAMPLE BOOK AS PART OF MY RESEARCH.

