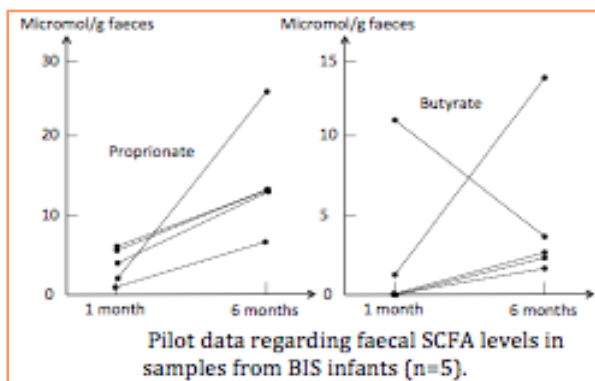


## BARWON INFANT STUDY - Our BIS family is now complete!!

Issue No.6 (August 2013)

We are hitting the really exciting phase of BIS!! Recruitment is complete, the last baby will be born in November and we'll finish the 1 month reviews early in January 2014. That means we will have data from the complete BIS cohort on a wide range of birth & early infancy outcomes. We now have 8 very bright students working on a range of projects, which include understanding the relationship between antenatal stress and infant health (Luka & Mary); investigating the relationship between modern chemical exposure & neurodevelopment (Christos & Nahanni), investigating the determinants and consequences of infant lung function (Ranjana & Sabina); investigating the early life origins of cardiovascular disease (Kate); and investigating the relationship between gut colonisation during early infancy and food allergy (John). Stay tuned!

An area we're particularly interested in is the role of a group of molecules, known as short chain fatty acids (SCFAs), in immune development & the risk of allergic disease. SCFAs are produced in the distal bowel by the fermentation of specific elements of our diet by specific organisms. Our diet and the composition of our gut organisms have changed in the modern environment. SCFAs are likely to play an important role in the symbiotic (mutually beneficial) relationship between our gut organisms and developing immune system. We have generated preliminary data suggesting that there may be an important increase in SCFAs levels in the baby's gut over the first 6 months of life (figure above, top right). Although the numbers are very small at this stage, these are highly novel and potentially important data. We now plan to extend this work to larger number of infants & explore the apparent increase SCFA levels during the early infancy & immune development. Once again...stay tuned!

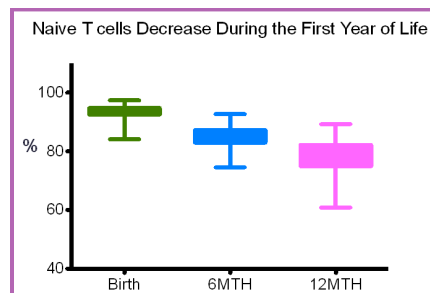


The work of our BIS lab staff has also been recognized recently with Danielle and Carling (pictured below) being invited to the 24th Annual Scientific Meeting of the Australasian Society of Clinical Immunology and Allergy (ASCI) in September to present their work. Along with their colleagues in the lab, Fiona, Gavin & Suzi, they've been busy processing the blood samples and the other biological specimens that you have diligently & generously contributed (see below). We are currently storing more than 100,000 individual aliquots, and have analysed the immune cells in more than 2000 blood samples.



**BIS lab staff, Carling, Suzie and Danielle (above, left— right) are busy organising and storing some of the 100,000 bio-samples we've received.**

The analysis of these immune cells has given us information on how a subset of these cells slowly loses their newly formed naïve characteristics and attains their immunological memory. This happens as they respond to foreign proteins (eg viruses and bacteria) over the first year of life (see below).



**The BIS sample freezers, affectionately known as 'B1' & 'B2'.**

**2013 BIS Participant Forums: Help us set the BIS research agenda!!**

Can you join us at one of the forums?  
**Wednesday 9th October, or  
Monday 11th November?**

We'll provide an update on some early study results, as well as a chance for you to give your suggestions and feedback to the research team.

See the leaflet inside for details.

## BIS Baby News

On 24th June, 2013 our three year recruitment phase ended with 1159 BIS families. There have been more than 900+ babies born into the study, with another 50+ to be born over the coming months !

### Here are some recent baby names:

Lilly, Sebastian, Lucas, Jillian, Cooper, Joshua, Thomas, Oliver, William, Mirabelle, Myles, Lucas, Thomas, Levi, Mila, Mak, Meg, Mitchell Brody, Oscar, Ava, Ella, Evie, Emilia Jane, Elisabeth, Brydie, Bailey, Bonnie, Leila, Lincoln, Leonard, Lillian, Nieve, Nyah, Paige, Harrison, Elian, Eddie, Henry, Jet, Judah, Hannah-May, Sari, Amelia, Sienna, Reggie, Finn, Ivy, Zack, Willow, Micah, Tawlu-Saeh, Arabella, Joseph, Krish, May, Oscar, Marley, Jack Grace, Angus, Charlotte, Liam, Ava, Asher, Alfie, Alexis, Oliver, Myles, Ciaran, Alienna, Clancy, Zyden, Flynn, Grace, Caleb, Hunter, Willow, Mia, Cambria, Alexander, Xavier, Isla, Mia, Nina, Audrie, Beau, Zavier, Ruby, Audra, Lucy, Ayla, Ava, Angus, Brielle, Ryder, Emma, Hannah, Harry, Lachlan, Patrick, Ebony, Willoughby, Mackenzie, Lenny, Eve, Wilson, Joel, Henry, James, Lexie, Frances, Ruby, Max, Logan, Cooper, William, Macy, Lily Rose, Luca, Sadie, Evie, Charlie, Aria, Harper, Ryder, Matilda, Winifred, Lux, Lewis, Greta, Giles, James, Joseph, Jonathan, Angelique, Alby, and Adeline.

## Meet the Team

### Spotlight on ... BIS Investigator, Professor David Burgner

**BIS News:** Tell us a bit about yourself!

**Dave:** I am a paediatrician & researcher, based at Murdoch Childrens Research Institute (MCRI) and Monash Children's. I'm originally from England; I moved with my family to Victoria – after a stint in Perth – about 4 years ago. One of the great attractions for the move (apart from the better coffee) was studies such as BIS, which is a really exciting and world-beating project. I am interested in infection and the early development of cardiovascular disease, so it was fantastic to be able to get involved in BIS and lead this aspect of the study. The BIS team and families are fantastic and great to work with.

**BIS News:** What do you most enjoy about your job?

**Dave:** I really enjoy the mix of clinical work (I am a specialist in childhood infection) and research. Working in a team and seeing others help develop and bring research ideas to fruition is a highlight. This is a really exciting time in paediatric research and BIS is right at the forefront. And of course the coffee...

**BIS News:** What's been happening in your field of research lately?

**Dave:** There's a lot of interesting child health research going on at the moment. Broadly, the medical and scientific community are realising that early life is really important in determining future adult health, eg in cardiovascular disease (heart attacks & stroke), which are of course largely conditions in adults, it's increasingly apparent that the changes in the blood vessels that lead to these outcomes begin in infancy.

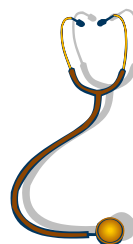


Understanding what determines this early risk – and crucially how to change it – is likely to be a growth area with real benefits for children & adults. BIS is ideally placed to investigate these sort of research questions.

**BIS News:** Now, what about an interesting fact about yourself...

**Dave:** I used to have hair down to my shoulders and was briefly a (not very good) secondary school teacher in India. My family comes from a background of German and Ukrainian refugees. My grandmother (Dodo Burgner) was a famous artist and went to primary school with Marlene Dietrich.

Introducing our new paediatric consultant, Dr Jackson Collier. BIS was very lucky to have Dr Collier's (right) services on hand, during younger brother Lachie's (below) 6 month visit to BIS.



# Meet the Webb - Nelson Family

Working in the health industry, and with a family history of allergies registered nurse Emma & physiotherapist James were keen to contribute to a local and important study like BIS. *“We both recognised the importance of this kind of research study in furthering best medical practice”.*

As first time parents to the Maddie Belle, now 2 & ½ years old, Emma says that one of her early pregnancy challenges was coping with the initial tiredness. *“But I was lucky that for the remainder of the pregnancy I was well. My biggest parenting challenge was making the transition into motherhood, not having a routine and getting used to that. Next time I would certainly listen to instinct and rely more on my own experiences than rely on specific literature”.*

But Emma reports that *“one of the best things about the pregnancy was the anticipation of meeting our little one. The joy we have had in getting to know Maddie, seeing her grow and develop has been very exciting. We feel our own family unit, and our own immediate family unit bonds have become even stronger”.*

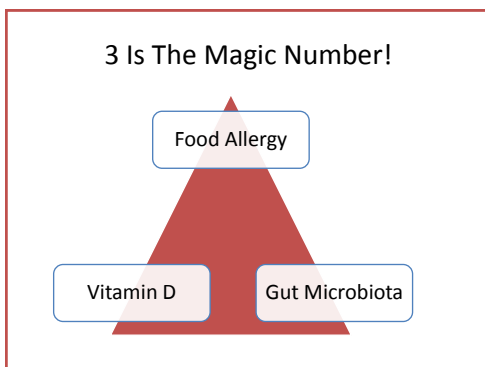


Now expecting a baby brother or sister to little Maddie the family are excited to repeat things all over again. The BIS team were lucky to see Maddie & Emma recently for Maddie’s 2 year review appointment.

*“I would absolutely recommend BIS to other families. The team is friendly, welcoming & accommodating. It’s also reassuring to know that if required, there is medical support available while in the study. Plus it’s a great feeling contributing to something so vital”.*

## BIS Students—Kicking goals!

Congratulations to BIS Paediatricians & PhD students Kate & John for recently winning their respective categories in the Murdoch Children’s Research Institute (MCRI) & Deakin University ‘3 minute Thesis’ competition. John talked about the BIS allergy study investigating the role of vitamin D & bugs in our gut in relation to the high rates of allergy in Victoria (slide, below left).



While Kate’s work looks at the antenatal determinants of cardiovascular disease, ie those things during pregnancy, delivery & the first few weeks of life that may affect vessel structure & therefore predispose infants to heart disease as an adult. BIS is using ultrasounds of the aorta at 4-12 weeks as a marker of this change in vessel structure (slide, to the right).

**Antenatal Determinants of Cardiovascular Disease**

SEQUENCES IN PROGRESSION OF ATHEROSCLEROSIS
<b>Initial lesion</b> • macrophage “foam” • macrophage infiltration • isolated foam cells
<b>Fatty streak</b> • mainly intracellular lipid accumulation
<b>Intermediate lesion</b> • intracellular lipid accumulation • small extracellular lipid pools
<b>Atheroma</b> • intracellular lipid accumulation • core of extracellular lipid
<b>Fibroatheroma</b> • single or multiple lipid cores • fibrotic/calcific layers
<b>Complicated lesion</b> • surface defect • fibrinoma-hemorrhage • thrombosis

## **Cortisol & it's possible contribution to 'baby brain'...**

In the previous newsletter, we introduced one of the major pregnancy hormones Oxytocin ('the love hormone'). This time we'll discuss cortisol, which is another major hormone that has a broad range of effects on the body, including a possible contribution to the phenomenon known as 'baby brain'.

Cortisol is perhaps best known as the 'stress hormone'. When we're stressed, our brains signal the adrenal cortex to release cortisol, which then enters the bloodstream and travels to peripheral organs and tissues. The exact functions of cortisol are not fully understood. However, we do know that it has certain anti-inflammatory properties that seem to counterbalance other 'pro-inflammatory' compounds in the body, such as histamine. We also know that cortisol can change the way our peripheral organs and tissues use energy; increasing the use of proteins and fats, and decreasing the use of glucose. This 'glucose sparing effect' is adaptive, because (unlike other organs) the brain relies on glucose as its sole energy source.

During pregnancy, cortisol has additional role to play, and therefore it behaves quite differently. Throughout the gestation period cortisol levels naturally increase, until they reach a final peak which is thought to stimulate parturition. However, pregnancy also seems to have a blunting effect on the cortisol response to day-to-day stress. In other words, the stressful situations which cause a sharp increase in cortisol prior to pregnancy, no longer have such a significant effect.

Some scientists think that this 'cortisol blunting' is one of the factors responsible for the 'baby brain' (or 'pregnancy brain') phenomenon that about 70-80% of women report during pregnancy (Sharp et al. 2005). However, the evidence of this relationship is very preliminary, and more research is needed to establish a conclusive scientific explanation for 'baby brain'. In the meantime, the next time you feel a little stressed, or even catch a cold; rest assured that cortisol is working hard to restore your body back to its everyday balance!

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The **Barwon Infant Study (BIS)** is conducted within the **Child Health Research Unit**, at **Barwon Health (ChERUB)**  
*Working together for children's health*



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