What have we learnt from NZ gout research?

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Bone and Joint Research Group
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Summary

• What is gout and how do we treat it?
• How common is gout in Aotearoa New Zealand?
• What impact does gout have?
• What causes gout?
• What causes joint damage in gout?
• What is the best treatment for gout?
• How can I get involved?
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What is gout?

• Urate crystals form in the presence of high uric acid levels in the blood (hyperuricaemia)

• Leads to
  • Episodes of severe arthritis
  • Nodules under the skin (tophi)
  • Joint damage
  • Work disability
Key target for effective gout treatment

Uric acid level below 0.36 mmol/L
Allopurinol

- First-line medication to reduce uric acid levels
- Need to take every day
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Prevalence of gout in Aotearoa New Zealand

Men, 2009, New Zealand Health Tracker data

Winnard Rheumatology 2012
Prevalence of gout in Aotearoa New Zealand

Women, 2009, New Zealand Health Tracker data
High Uric acid in the blood

Joints, Soft Tissues

Blood Vessels

Gout

Winnard NZMJ 2013
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The impact of gout on patients: severe pain

• “Well when I get it there is a lot of throbbing in the area, it just feels like the area that is inflamed, is cooking, I mean it is hot, a real hot sensation and then if it is real bad it feels like the flesh is trying to rip your outside you know its like it is going to burst you know your skin is stretching and it is going to rip because it is stretching too much that is sort of just how it sort of feels.”

Lindsay J Clin Rheumatol 2011
The impact of gout on patients: effect on sports

- “I couldn’t play sport whatsoever when I’d had gout, and I was always really cautious about getting any knock on the foot or the toes. I enjoyed cricket so I didn’t play cricket, just the mere thought of having the ball strike your toes really. Stopped playing badminton because I got gout in the wrist. In a lot of ways it prevented me from playing sports.”

Lindsay J Clin Rheumatol 2011
The impact of gout on family

“...It is very hard for them because it was lucky the last time I got it that was six days and I didn’t want to come to hospital so I told them I would stay home and it was lucky that my son. I have two sons and I was lucky that their shifts didn’t cross. So one would come and look after me and the other one would come when it was his turn to go to work and then when my wife went to work someone else would come...”

Lindsay J Clin Rheumatol 2011
Impact of gout on hand function

Dalbeth Rheumatology 2007
Impact of gout on foot function
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• What causes joint damage in gout?
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The Ups & Downs of Uric Acid

Genetic Factors

Kidney Function

What we Eat & Drink

‘Metabolic Factors’

Medication

Serum Uric Acid
Genetics of Gout in Aotearoa Study

WHAT WE ARE

CHANCE

ENVIRONMENT

GENES

COUNTIES MANUKAU DISTRICT HEALTH BOARD
enhancing mind, body & spirit

QE HEALTH
# Genetics of Gout in Aotearoa Study

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<td>✓</td>
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<td>-</td>
</tr>
</tbody>
</table>

Hollis-Moffatt et al *Arthritis Rheum* 2009  
Phipps-Green et al *Hum Mol Genet* 2010  
Hollis-Moffatt et al *Arthritis Res Ther* 2011
Our genes interact with the environment to increase the risk of developing gout.
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Imaging studies: uric acid crystals are present in the joints even when there is no gout pain.

Dalbeth Ann Rheum Dis 2013
Imaging studies of joint damage

Dalbeth *Ann Rheum Dis* 2009
Dalbeth *Rheumatology* 2010
Dalbeth *Arthritis Res Ther* 2012
McQueen *Rheumatology* 2013
Mapping sites of bone damage: bioengineering approach

Fernandez unpublished
Laboratory studies of joint damage

NO TOPHUS

TOPYHUS

Bone

Bone

T

50μm

Dalbeth *Arthritis Rheum* 2008
Chhana *Ann Rheum Dis* 2012
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Key target for effective gout treatment

Uric acid level below 0.36 mmol/L
Allopurinol dosing studies

% patients achieving SUA

No allopurinol: 4%
Lower than recommended: 15%
Recommended: 19.1%
Higher than recommended: 38%

Dalbeth J Rheumatol 2007
Allopurinol dose escalation

• Well tolerated in open studies

• Leads to high achievement of uric acid target (>85%)
Intensive lowering of uric acid may improve joint damage in advanced gout

Baseline

After 2 years of pegloticase therapy

Dalbeth Arthritis Care Res 2013
Dietary intervention studies

• No benefit for Vitamin C supplementation on serum urate targets

• Skim milk enriched with certain milk products leads to greater reduction of gout attacks

Stamp Arthritis Rheum 2013
Dalbeth Ann Rheum Dis 2012
Footwear with good cushioning and motion control can reduce foot pain and disability in people with gout.
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Now recruiting!

• Foot function study: Auckland University of Technology

• Genetics of Gout in Aotearoa Study: University of Auckland, University of Otago

• Imaging studies in early gout: University of Auckland

• Allopurinol dosing study: University of Auckland, University of Otago

• Contact Chris Franklin: University of Auckland
  – c.franklin@auckland.ac.nz
Other New Zealand gout researchers
Acknowledgements