

SIRAKOSS

*The skeleton of a
science start up*

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Talk Content

- About SIRAKOSS
- About Unmet Clinical Need and Use of BGS
- My employment responsibilities
 - UOA
 - SIRAKOSS
- Current status of SIRAKOSS

SIRAKOSS

- University of Aberdeen Spin out company
- Medical Device Company formed in 2010
- Registered Office in Edinburgh
- R&D staff based in Aberdeen
- Technology spun-out in 2011
- Formed to commercialise UoA Intellectual Property
 - Synthetic bone graft substitute (MaxSi™ Graft)
 - Primary use in spinal applications, but also has applications in maxillofacial, trauma, dental markets

Modern life and the requirement for surgical treatment

- Congenital defect
- More active- increased wear and tear
- Extreme sports- stresses and trauma
- Increased life expectancy- bones and joints wear out with time

Spine health in a fast paced society

- Accidents do happen – trauma events
- Lifestyle choices and working habits
- Old age – spine naturally degenerates

Current bone graft options

- Autograft- your own bone
 - Painful
 - Secondary operation, increased time and cost
 - Chance of infection
 - Limited supply
- Allograft – another persons bone
 - Harvested at the morgue
 - Potential for disease transmission?
 - Inherent variability from donors, pensioner vs youth
- Bone Morphogenetic Protein
 - Expensive compound generating high sales (\$800m in US in 2011),
 - More recent reports of complications e.g. ectopic bone formation.
 - Initially approved as a device in lumbar spine
- Synthetic
 - Reproducible
 - Unlimited supply
 - Lower unit cost – affordability important in current healthcare climate
 - Mixed with blood and/or local autograft

Bone graft applications in spine

- Global bone fusion market valued >\$2.5bn
- Many procedures and conditions e.g. spondylolisthesis, scoliosis, herniated disc, disc degenerative disease, trauma event, bone tumour
- Surgeon seeks to correct a defect, repair broken bone or fuse existing bone together

Calcium phosphate synthetic bone graft substitutes

Most current Products

- *Hydroxyapatite $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$
and/or tricalcium phosphate $\text{Ca}_3(\text{PO}_4)_2$*
- *Highly porous (60-80% porous)*
- *Pore size (200-1000 μm)*
- *Surface area (0.5-2 m^2/g)*
- *Slow (HA) or rapid (TCP) solubility*
- *Osteoconductive properties*

Our proprietary technology

SIRAKOSS

Market Benefits



	WHAT	WHY	WHO
<i>Feature</i>	High wt.% silicon		
	Granule structure	<i>Correlation to bone growth</i>	➤ <i>Patient</i>
	High surface area		
<i>Benefit</i>	Fast blood absorption	<i>Rapidly forms a palpable mass ready for use</i> ➤ <i>Reduce operating time</i> ➤ <i>Reduce anaesthesia time</i>	➤ <i>Surgeon; Hospital</i> ➤ <i>Patient; Hospital</i>
	Improved bone fusion	<i>Surgeon reassurance</i>	➤ <i>Surgeon</i>
		<i>Reduced patient morbidity</i>	➤ <i>Patient</i>
<i>Earlier return to full activity</i>		➤ <i>Insurer, State</i>	

The Solution

SIRAKOSS

MaxSi™ Graft

Synthetic
Controllable
Bone Formation



Confidentiality

- Exciting data from a range of studies conducted
 - No publications
 - Frustration for academics
 - Limited collaboration
- Patent Portfolio – expanding
- Lots of trade secrets/ know-how



Research leading to SIRAKOSS

- 2005 EPSRC Advanced Research Fellowship grant – Prof Iain Gibson
- 2007 Scottish Enterprise Proof of Concept Funding awarded to UoA



University of Aberdeen

- 2007-2010 RA in Chemistry Dept.
 - Refine the composition and reaction methods
 - Produce and bench test samples, XRF, XRD, ICP-OES, FTIR, MIP, BET, SEM
 - Meet with end users
 - Demonstrate repeatability in synthesis
 - Demonstrate a level of safety and efficacy, PCS
 - File IP e.g. patent, know-how, trademarks
 - Assess feasibility of commercialising the IP
 - Project change of direction based on market assessment information

Post PoC Funding- Major decisions

- Great idea- but what next?
 - Form a company, licence technology, sit back?
 - Stay in academia or take a gamble?
- Where to turn
 - University Research and Innovation
 - SE Commercial advisor
 - Colleagues
- Formulate a business plan
 - Commercial advisors
 - Interim CEO

Company Financing

- Founders investment
- FFF Round
- Grants e.g. Scottish Enterprise (SMART) = £30k own money matched with £70k
- Seed Fund Round
- Series – A
 - Angel Group
 - Venture Capitalist
 - » Advance technology – add value, milestones
 - » Grow company- new staff, equipment, data
 - » Give something back

Day 1- All alone

- No email address
- No phone or IT support
- Premises – Incubator Units
- Chemicals – No University discount
- Analysis – No discount, access charges
- Purchasing documentation
- Expense forms
- Time sheets

Current status after 4 years

- Growing company
 - Directors
 - Consultants
 - Employees
- New research facilities at Polwarth
- Edinburgh Office
- Managing suppliers EU, US
- Outsource manufacturing
- Design Dossier/Technical file
- Toxicology studies
- Write protocols and manage test facilities

What about me?

- Director (4 years), Shareholder, Inventor and Employee of SIRAKOSS (R&D Manager)
- Chemist
 - Patent Applications
 - New formulations, further applications
- Industrial Fellowship award holder- Royal Commission for the Exhibition of 1851
 - Bridge between academia and industry
 - **Mission** “increase the means of industrial education and extend the influence of science and art upon productive industry”
 - Provide salary support, plus university fees paid, £10,000 honorarium to University, plus £3500 travel p.a.



Proof it can be done

ApaTech Ltd

- Queen Mary University London spin out
- Prof Iain Gibson a scientific founder
- Silicated Hydroxyapatite material
- Incorporated in 2001
- July 2001 Series A Funding : £3m
- March 2010 Exit trade sale to Baxter International for \$330m

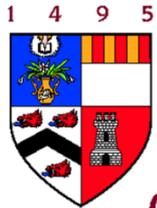
Progentix BV

- Twente University
- Incorporated 2007
- Jan 2008 Funding stage : €1m
 - » 510k filed Mar 2009 (CuriOs*)
 - » granted Oct 2009
- Jan 2009 Investment by Nu-Vasive
 - \$10m for 40% (\$25m valuation)
 - + \$5m loan + \$45m + \$25m milestones
 - staged exit

Thank you

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UNIVERSITY
OF ABERDEEN



Scottish Enterprise



- Want to work for us?
- Want to start your own company?
- Would you do it?

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