Revolutionising the treatment of blood-borne diseases

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1. About MediSieve
2. The journey
3. Tips for entrepreneurs
The Technology
Vision

Revolutionise the treatment of blood-borne diseases

Tool to remove anything from the bloodstream

Chronic pain
Sepsis
Viral infections
Leukaemia
Parasitic infections
Malaria
Auto-immune
Cytokine Storms
Post-operative care
Personalised medicine
Veterinary applications
Organ transplantsations
Cancer
GVHD
Drug overdoses
Pre-eclampsia
Poisoning
Organ transplantsations
George Frodsham
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Magnetic Blood Filtration
Magnetic Blood Filtration

✓ Remove practically anything from blood
✓ One or several targets with high specificity
✓ Treatment time 2-4hrs
✓ Cost-effective
✓ Integrates with standard blood pumps

The MediSieve Magnetic Filter captures targeted magnetic particles and the substances bound to them.

*Not required for malaria, due to the magnetic properties of malaria infected cells
Potential Applications

- **Viral infections** £80B
- **Auto-immune diseases** £80B
- **GVHD** £1.2B
- **Malaria** £150M
- **Leukaemia** £780M
- **Sepsis** £1.8B
- **Preeclampsia** £1.5B

**TECHNICAL CHALLENGE**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Easy</th>
<th>Hard</th>
</tr>
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<tbody>
<tr>
<td>Current focus</td>
<td>Malaria £150M</td>
<td>Sepsis £1.8B</td>
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Benefits
Clinical Rationale: Sepsis

Target patients: Sepsis patients in intensive care units

1. Two facets to disease: infection (pathogens) and immune overreaction (cytokines)
2. Antibiotics only target infection
3. MediSieve can target both

Benefits:
1. Stop sepsis cascade
2. Calm immune reaction without immunosuppressing
3. Lower mortality
4. Reduce treatment costs
Clinical Rationale: CRS

Target patients: Cancer patients treated with CAR-T cell therapy

Rationale:
1. Cytokine release syndrome is a common side effect of CAR-T therapy.
2. Immunosuppressants reduce the benefits of CAR-T therapy.
3. Controlling blood cytokine levels treats CRS without affecting the therapeutic effect at the tumor site.

Benefits:
1. Control the patient's immune reaction.
2. “Tune” levels of inflammatory cytokines.
3. Improve outcomes for CAR-T therapies.
Clinical Rationale: Severe Malaria

Target patients:
- Hospitalised with severe malaria
- Prescribed IV drugs

Rationale:
1. Parasite clearance rate is key indicator of survival
2. Currently 36–48 hours
3. MediSieve with drugs could reduce to 4–6 hours

Benefits:
1. Faster symptom elimination
2. Prevent disease escalation
3. Lower mortality
Clinical Rationale: Leukaemia

Target patients: Leukaemia patients with high WBC counts

Rationale:
1. High WBC counts cause symptoms
2. High WBC counts increase side-effects and reduce efficacy of chemotherapies
3. Bringing down to normal levels will improve outcomes

Benefits:
1. Eliminate symptoms of hyperleukocytosis
2. Improved efficacy of treatments
Clinical Benefits

Rapid and selective removal of one or more targets

**Direct benefits**
- ✓ Symptom elimination
- ✓ Prevent disease escalation
- ✓ Attenuate immune response
- ✓ Reduce time in hospital (and cost)
- ✓ Reduce mortality

**Ancillary benefits**
- ✓ Personalised treatments
- ✓ Improve drug efficacy
- ✓ Reduce drug side-effects
- ✓ Concentrating of rare targets (diagnosis)
- ✓ High volume harvesting
## Competitive Advantages

<table>
<thead>
<tr>
<th></th>
<th>MediSieve</th>
<th>Drug therapies</th>
<th>Size based columns</th>
<th>Adsorption columns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid (hours)</td>
<td>✓</td>
<td>❌</td>
<td>✓</td>
<td>❌</td>
</tr>
<tr>
<td>Specific</td>
<td>✓</td>
<td>✓</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Selective</td>
<td>✓</td>
<td>✓</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Several targets</td>
<td>✓</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Can be turned off</td>
<td>✓</td>
<td>❌</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Removes rather than kills</td>
<td>✓</td>
<td>❌</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Non-toxic</td>
<td>✓</td>
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<td>✓</td>
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Products
MediSieve Magnet
→ Same for each application

MediSieve Filter
→ Same for each application

MediSieve Particles
→ Different for each application

Consumables

1. Malaria
2. Sepsis
3. Leukaemia
4. Others
<table>
<thead>
<tr>
<th>Target</th>
<th>Applications</th>
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<tbody>
<tr>
<td><strong>Pathogens:</strong></td>
<td></td>
</tr>
<tr>
<td>• LPS (endotoxins &amp; bacteria)</td>
<td>• Sepsis</td>
</tr>
<tr>
<td>• HMGB-1</td>
<td></td>
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<tr>
<td><strong>Cytokines:</strong></td>
<td></td>
</tr>
<tr>
<td>• IL-6</td>
<td>• Sepsis</td>
</tr>
<tr>
<td>• IL-1β</td>
<td>• Auto-immune diseases</td>
</tr>
<tr>
<td>• IL-18</td>
<td>• Cytokine storms (e.g. CRS)</td>
</tr>
<tr>
<td>•</td>
<td>• Organ transplantation</td>
</tr>
<tr>
<td><strong>Cells:</strong></td>
<td>• Leukaemia</td>
</tr>
<tr>
<td>• CD20 (white blood cells)</td>
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✓ IP owned wholly by MediSieve (assignment from UCL)

✓ Two patents under PCT:  
  • Filter patent (granted in US)  
  • Mixing of MediSieve particles in blood

✓ Particles: currently trade secret; patent planned
Quality & Regulatory Strategy

Filter & magnet:
✓ Class IIa medical device
✓ Passed ISO 10993 biocompatibility testing

Magnetic particles:
✓ Class III medical device
✓ Extracorporeal only

Parallel track CE mark and FDA approvals

ISO 13845 (QMS): Cert. in 2020
About MediSieve
Milestones

2015-16
- Spun-out from University College London
- £350k seed investment
- £200k grants (Wellcome Trust & Innovate UK)
- Clinical prototyping

2017:
- Animal trials (Filter & Magnet)
- £200k of grants (NIHR & EU)

2018:
- £1.75M equity funding
- £1.56M grants (Innovate UK)
- Development of Magnetic Particles

2019-20:
- *In vitro* validation (Magnetic Particles)
- Animal trials (Sepsis)
- Malaria clinical trials
- CE Mark for Filter & Magnet
The Team

George Frodsham
CEO

Cristina Blanco
CTO

Will Twigger
Head of Engineering

Alice Mazzer
Senior Biochemist

Kerstin Stegmann
Senior Immunologist

Jonathan
QA/RA Analyst

Alina
Marketing Analyst

Lucy
Biochemist

Ana
Biochemist

Mani
Biochemist

Silvia
Biochemist
The Board

Quentin Pankhurst
Chairman
QA/RA Director

Chris Jones
Strategic Director

George Frodsham
CEO

Marek Gumienny
24 Haymarket
Investor Director

Gaby Salem
Investor Director
Plan Going Forward

Series A: £7-10M

- 2020: POC
- 2021: Clinical trial
- 2022: Licence

Malaria (grant funded)

Series B / exit

- 2022: Commercialise

Sepsis

- Animal trials
- POC
- Clinical trial
- Reg. Cert.

Leukaemia/CRS

- In vitro
- Animal trials
- POC
- Clinical trial
The Journey
BBSRC Enterprise Fellowship

2014
- ✓ End of PhD
- ✓ Simple proof of concept of filter
- ✓ Awarded Enterprise Fellowship

2015
- ✓ Launched company
- ✓ IP deal with UCL
- ✓ Patent filed
- ✓ £350k angel investment
- ✓ £200k grants
Growth
Challenges

1. Spinning out → Assignment deal
2. Fundraising → >£4M (grants & investment)
3. From *in vitro* to *in vivo* → Ready for clinical trial
4. Intellectual property → Patent granted
5. Regulatory → Ongoing…
Tips
Advice for Entrepreneurs

1. Talk to people & get help
2. Self-belief combined with self-doubt
3. Take advantage of opportunities
4. Take considered risks
5. Prioritise & take it day-by-day
6. Don’t ruin your life
Magnetic Blood Filtration

✓ Platform technology with large potential market
✓ First targets malaria, leukaemia and sepsis
✓ Looking for partnerships and investment

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