Ceramic excellence for the treatment of bone infections and bone tumors
Our vision, our goal

Becoming the leader of bone replacement for infection & cancer with our innovative implants made of porous alumina ceramic
Surgery evolution

From ablation to micro-invasive and ambulatory surgery

1950 1980
1990 2005
2015 2020

Photo credit: Florian Launette - Romain Pages éditions « J’ai un cancer du sein et après ? »
Infection
- Native bone
- Prosthesis

BONE DEFECT

Agenesis

Cancer
Our technology

CERAMIC IMPLANT + Active molecule

Diseased part:
- Infection
- Cancer

The First Active Bone Implant
Financial figures
Financial figures

Identification
- ISIN: FR0011511971
- Mnemonics: ALICR
- Industry: HealthCare
- Principal stock market index: Alternext All-Share
- Stock market: Alternext
- Place of quotation: Euronext Paris (France)

Shareholding
- Stock of shares: 5340702
Shareholding

- Andre KERISIT: 50%
- Xale Finance: 37.62%
- Ernee Gestion: 13.38%
- Investisseurs Institutionnels: 34.57%
- InvestisseursPrivés (ISF-TEPA): 9.51%

INVESTISSEMENT DÉVELOPPEMENT: 55.92%

- I.CERAM SRO: 100%
- Limousine de Brevet: 75%
- Ernee Gestion et 2 personnes physiques: 25%
Who are we?
Limoges
Your contacts

André KERISIT
CEO, Founder
- 32 years experience in orthopaedic devices
- Sales manager (OMCI)
- Implants Distribution founder

Christophe DURIVAULT
Financial Director
- Ceramics engineer (ENSCI)
- 10 years experience in company financing
- Head of regional agency « Limousin Expansion »
Your contacts

Eric DENES, M.D
Scientific Director

- Infectious diseases specialist, expert in antibiotherapy
- Chenieux Private Clinic, Limoges
- Orthopaedic surgery multidisciplinary team for infections
  - Reference Center for Complex Bone and Joint Infections
- > 60 scientific publications
  - 13 related to Bone and Joint Infection
- Masters Degree in Biological Research
I.CERAM in few words

- Created in 2005 in Limoges (European Ceramic Cluster)
- Conception, manufacturing, and marketing of innovative prostheses and implants for bone surgery
- An integrated industrial structure
- A multidisciplinary scientific committee created in 2013

- 14 patents pending
- 30 years of expertise in orthopaedic implants

- World 1st sternal implant in March 2015
- World 1st loaded implant in June 2016
A vertically integrated business model that protects the expertise and stimulate innovation

| Distribution          | • Direct selling in France: 10 sales representatives  
|                       | • 2 Branches  
|                       | • Exclusive or Non-Exclusive Distributors |
| Sterilizing          | • Packing  
|                      | • Clean room ISO 7 |
| Certification        | • Products  
|                      | • Management  
|                      | • Process validation |
| Manufacturing        | • 40 employees: mechanical production centre  
|                      | • Ceramic Laboratory  
|                      | • Chemical and Biological Laboratory |
| Design               | • Independent scientific committee  
|                      | • 30% of TO re-invested in R&D  
|                      | • Internally managed scientific expertise: 8 Ph. D. & MD |
| Listening            | • A close relationship with surgeons  
<p>|                      | • From ideas to creation of the product |</p>
<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Speciality</th>
<th>Department</th>
<th>Skills</th>
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<tbody>
<tr>
<td>D. SETTON</td>
<td>M.D</td>
<td>Orthopaedic surgeon</td>
<td>Emailleurs Private clinic</td>
<td>Orthopaedic surgery</td>
</tr>
<tr>
<td>F. FIORENZA</td>
<td>M.D</td>
<td>Orthopaedic surgeon</td>
<td>Limoges teaching hospital</td>
<td>Orthopaedic surgery – Infection and cancer</td>
</tr>
<tr>
<td>F. BERTIN</td>
<td>M.D</td>
<td>Cardiothoracic surgeon</td>
<td>Limoges teaching hospital</td>
<td>Lung &amp; thoracic wall surgery</td>
</tr>
<tr>
<td>F. STURTZ</td>
<td>M.D. Ph.D</td>
<td>Biochemistry &amp; Genetics</td>
<td>Limoges teaching hospital</td>
<td>Biochemistry, long release, Founder of MedinCell, Head of biochemistry lab</td>
</tr>
<tr>
<td>M. VIANA</td>
<td>Ph.D</td>
<td>Pharmacy</td>
<td>Limoges Pharmacy University</td>
<td>Galenic, design in pharmaceutical products</td>
</tr>
<tr>
<td>V. SOL</td>
<td>Ph.D</td>
<td>Chemistry</td>
<td>Limoges University</td>
<td>Photochemistry, organic chemistry, Head of CNRS EA 1069</td>
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<tr>
<td>T.S. OUK</td>
<td>MCU, lecturer</td>
<td>Biology</td>
<td>Limoges University</td>
<td>Bacteriology, cell culture</td>
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<td>C. MAGE</td>
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<td>Animal Health</td>
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<td>Animal testing, animal protocol development</td>
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<tr>
<td>S. EL BALKHI</td>
<td>M.D</td>
<td>Pharmacology</td>
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<td>Pharmacokinetics</td>
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<tr>
<td>J. MONTEIL</td>
<td>M.D. Ph.D</td>
<td>Nuclear imaging</td>
<td>Limoges teaching hospital</td>
<td>Dynamic imaging, Head of nuclear imaging department</td>
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<tr>
<td>I. QUELVEN-BERTIN</td>
<td>M.D</td>
<td>Nuclear pharmacy</td>
<td>Limoges teaching hospital</td>
<td>Nuclear imaging</td>
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</tbody>
</table>
An internal research lab

- Ceramic
- Bacteriology
- Cell culture
- Chemistry
Specific cutting-edge technology tools

- Digital controlling tools
- Surface analysing tools
- Ultra-sound machining robots
Continuous innovation

- **9 product lines** covered by 12 patents
- **37 000** operations, **126 000** implantations (No materiovigilance)
- Products adapted to the anatomy of human body

**2 to 10 years of clinical follow-up on I.CERAM products**

**1st sternum implantation in March 2015**
A WORLDWIDE MARKET

Costa Rica

Distributors

Subsidiaries

Headquarters

England

Belgium

Czech Republic

Portugal

Spain

Italy
Background
Osteomyelitis

- Annual incidence of osteomyelitis:
  - 21.8 cases per 100,000 person-years
- In France, in 2008
  - 21,000 Osteomyelitis and osteoarthritis

Grammatico-Guillon L et al BEH 4-5 / 5 février 2013
Chronic bone infection

- Risk of chronic infection
  - Biofilm
- Antibiotics usually not efficient by themselves
- Need for bone removal
Prosthesis infection

- 800,000 joint prostheses / year
  - USA + UK
  - Forecast for 2030: 4,000,000

- Infections
  - 1st implantation
    - 1% - 4%
  - Prosthesis exchange
    - 15 - 25%

Prosthesis infection - Cost

Table 1: Cost of noninfected TIR and debridement and retention for treatment of infected TIR [18].

<table>
<thead>
<tr>
<th></th>
<th>Non-infected TIR</th>
<th>Infected TIR</th>
<th>P</th>
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<tbody>
<tr>
<td>Total inpatient</td>
<td>22,688</td>
<td>57,494</td>
<td>0.001</td>
</tr>
<tr>
<td>Medical</td>
<td>1732</td>
<td>917</td>
<td>0.001</td>
</tr>
<tr>
<td>Nursing</td>
<td>7830</td>
<td>28,140</td>
<td>0.001</td>
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<tr>
<td>Operating room</td>
<td>11,173</td>
<td>18,977</td>
<td>0.001</td>
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<tr>
<td>Implants</td>
<td>7468</td>
<td>8336</td>
<td>0.3</td>
</tr>
<tr>
<td>Intensive care unit</td>
<td>0</td>
<td>0</td>
<td>1.0</td>
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<tr>
<td>Allied health</td>
<td>1362</td>
<td>3707</td>
<td>0.001</td>
</tr>
<tr>
<td>Medical imaging</td>
<td>64</td>
<td>278</td>
<td>0.001</td>
</tr>
<tr>
<td>Pathology</td>
<td>188</td>
<td>1710</td>
<td>0.001</td>
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<tr>
<td>Pharmacy</td>
<td>331</td>
<td>2388</td>
<td>0.001</td>
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<tr>
<td>Hospital at home</td>
<td>469</td>
<td>1624</td>
<td>0.02</td>
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<tr>
<td>Total outpatient</td>
<td>377</td>
<td>4426</td>
<td>0.001</td>
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<tr>
<td>Medical</td>
<td>23</td>
<td>901</td>
<td>0.03</td>
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<td>Nursing</td>
<td>278</td>
<td>442</td>
<td>0.002</td>
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<tr>
<td>Allied health</td>
<td>0</td>
<td>44</td>
<td>0.002</td>
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<tr>
<td>Medical imaging</td>
<td>0</td>
<td>120</td>
<td>0.001</td>
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<tr>
<td>Pathology</td>
<td>0</td>
<td>146</td>
<td>0.001</td>
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<tr>
<td>Pharmacy</td>
<td>0</td>
<td>1846</td>
<td>0.001</td>
</tr>
<tr>
<td>Total emergency</td>
<td>0</td>
<td>353</td>
<td>0.001</td>
</tr>
<tr>
<td>Total costs</td>
<td>24,073</td>
<td>75,661</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Table 2: Different options of treatment of PJL. Estimated average cost in 2012 adjusted currencies and normalized to US$.  

<table>
<thead>
<tr>
<th>Author (date)</th>
<th>Debridement and retention</th>
<th>One-stage revision</th>
<th>Two-stage revision</th>
<th>Resection arthroplasty</th>
<th>Arthrodesis</th>
<th>Amputation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peel et al. (2013) [18]</td>
<td>75,661</td>
<td>THA</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fisman et al. (2003)</td>
<td>74,015</td>
<td></td>
<td>70,634</td>
<td></td>
<td></td>
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<tr>
<td>Klouche et al. (2010)</td>
<td>43,586</td>
<td></td>
<td></td>
<td>75,737 × 1.7</td>
<td></td>
<td></td>
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<tr>
<td>Hebert et al. (1996)</td>
<td>150,984</td>
<td></td>
<td>121,866</td>
<td>101,346</td>
<td>347,789</td>
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<tr>
<td>Lavernia et al. (2006)</td>
<td>133,970</td>
<td></td>
<td>134,670</td>
<td>113,575</td>
<td></td>
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</table>

*Total hospital costs.
**Total hospital costs + total outpatient costs.
Prosthesis infection - Cost

- Long-term economic societal effect of periprosthetic infections (Hip)

<table>
<thead>
<tr>
<th>Table 6. Results and sensitivity analysis of total costs of two-stage revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at revision and rate of failure</td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td>First-year failure rate</td>
</tr>
<tr>
<td>65 year-old</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>60 year-old</td>
</tr>
<tr>
<td>55 year-old</td>
</tr>
<tr>
<td>Annualized failure rate after first year</td>
</tr>
<tr>
<td>65 year-old</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>60 year-old</td>
</tr>
<tr>
<td>55 year-old</td>
</tr>
<tr>
<td>All costs listed in 2016 USD.</td>
</tr>
</tbody>
</table>

Prosthesis infection - Cost

Cancer

- **Primitive cancer**
  - Osteosarcoma
    - Incidence: 0.3/100,000/year
    - Up to 1.1/100,000/year (young adults)
  - More than $100,000 per patient

- **Bone metastasis**
  - Breast (50-85 %)
  - Prostate (50-75 %)

For all these diseases

- Chronic diseases
- Risk of functional sequelae
- Multiple surgeries
- Relapses (even years after)
Deep Sternal Wound Infection

- Medistinitis
  - Following cardiac surgery with sternotomy
  - Incidence: 0.5 to 5%
  - In the USA:
    - Cardiac surgery:
      - Around 500,000 procedures per year
        - Coronary bypass and valvular surgery
        ⇒ About 10,000 post surgical infections
      - Risk of death 6 months after surgery: about 15 to 20%

Circulation. 2017;135:00–00 (AHA – 2017 report Update)
Same bone, different diseases

Infection

Cancer

Same device

Infection

Cancer

Agenesis
### Leading causes of death

<table>
<thead>
<tr>
<th>Leading causes 1990</th>
<th>Leading causes 2006</th>
<th>Mean % change number of YLLs 1990-2006</th>
<th>Mean % change all-age YLL rate 1990-2006</th>
<th>Mean % change age-standardised YLL rate 1990-2006</th>
<th>Leading causes 2016</th>
<th>Mean % change number of YLLs 2006-16</th>
<th>Mean % change all-age YLL rate 2006-16</th>
<th>Mean % change age-standardised YLL rate 2006-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ischaemic heart disease</td>
<td>1 Ischaemic heart disease</td>
<td>-28.2</td>
<td>-34.6</td>
<td>-46.6</td>
<td>1 Ischaemic heart disease</td>
<td>-4.6</td>
<td>-9.4</td>
<td>-22.2</td>
</tr>
<tr>
<td>2 Cerebrovascular disease</td>
<td>2 Lung cancer</td>
<td>9.0</td>
<td>0.7</td>
<td>16.9</td>
<td>2 Lung cancer</td>
<td>4.5</td>
<td>-0.8</td>
<td>-13.2</td>
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<tr>
<td>3 Lung cancer</td>
<td>3 Cerebrovascular disease</td>
<td>-22.2</td>
<td>-29.2</td>
<td>-42.1</td>
<td>3 Cerebrovascular disease</td>
<td>-6.1</td>
<td>-10.8</td>
<td>-23.7</td>
</tr>
<tr>
<td>4 Road injuries</td>
<td>4 Self-harm</td>
<td>4.9</td>
<td>4.5</td>
<td>-5.7</td>
<td>4 Alzheimer’s disease</td>
<td>30.5</td>
<td>23.9</td>
<td>-1.4</td>
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<tr>
<td>5 Self-harm</td>
<td>5 Alzheimer's disease</td>
<td>49.0</td>
<td>35.7</td>
<td>0.8</td>
<td>5 Self-harm</td>
<td>13.7</td>
<td>9.8</td>
<td>-6.3</td>
</tr>
<tr>
<td>6 Colorectal cancer</td>
<td>6 COPD</td>
<td>-35.0</td>
<td>-40.8</td>
<td>-38.9</td>
<td>6 COPD</td>
<td>-2.6</td>
<td>-7.5</td>
<td>-8.0</td>
</tr>
<tr>
<td>7 COPD</td>
<td>7 Colorectal cancer</td>
<td>9.7</td>
<td>0.1</td>
<td>-16.2</td>
<td>7 Colorectal cancer</td>
<td>6.2</td>
<td>0.8</td>
<td>-11.2</td>
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<td>8 Alzheimer's disease</td>
<td>8 Lower respiratory infections</td>
<td>10.6</td>
<td>0.7</td>
<td>-18.2</td>
<td>8 Lower respiratory infections</td>
<td>8.5</td>
<td>3.0</td>
<td>-12.6</td>
</tr>
<tr>
<td>9 Lower respiratory infections</td>
<td>9 Road injuries</td>
<td>1.4</td>
<td>-7.7</td>
<td>-25.6</td>
<td>9 Road injuries</td>
<td>-22.1</td>
<td>-26.0</td>
<td>-25.2</td>
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<tr>
<td>10 Stomach cancer</td>
<td>10 Breast cancer</td>
<td>0.5</td>
<td>-8.5</td>
<td>-22.2</td>
<td>10 Breast cancer</td>
<td>0.8</td>
<td>-4.4</td>
<td>-12.4</td>
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<td>11 Breast cancer</td>
<td>11 Diabetes</td>
<td>14.7</td>
<td>4.4</td>
<td>-12.3</td>
<td>11 Diabetes</td>
<td>1.5</td>
<td>-3.7</td>
<td>-14.9</td>
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<tr>
<td>12 Congenital anomalies</td>
<td>12 Stomach cancer</td>
<td>-21.7</td>
<td>-28.7</td>
<td>-40.3</td>
<td>12 Pancreatic cancer</td>
<td>17.5</td>
<td>11.6</td>
<td>-2.3</td>
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<tr>
<td>13 Diabetes</td>
<td>13 Pancreatic cancer</td>
<td>33.9</td>
<td>21.9</td>
<td>2.2</td>
<td>13 Chronic kidney disease</td>
<td>21.0</td>
<td>14.9</td>
<td>-1.4</td>
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<tr>
<td>14 Neutonatal perinatal death</td>
<td>14 Chronic kidney disease</td>
<td>25.5</td>
<td>14.3</td>
<td>-6.7</td>
<td>14 Stomach cancer</td>
<td>-5.5</td>
<td>-10.3</td>
<td>-21.4</td>
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<td>15 Other cardiovascular diseases</td>
<td>15 Liver cancer</td>
<td>38.9</td>
<td>26.5</td>
<td>6.1</td>
<td>15 Liver cancer</td>
<td>11.6</td>
<td>6.0</td>
<td>-6.3</td>
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<tr>
<td>16 Pancreatic cancer</td>
<td>16 Other cardiovascular diseases</td>
<td>6.9</td>
<td>-2.7</td>
<td>-19.0</td>
<td>16 Other cardiovascular diseases</td>
<td>5.7</td>
<td>0.3</td>
<td>-12.7</td>
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<td>17 Chronic kidney disease</td>
<td>17 Congenital anomalies</td>
<td>-42.7</td>
<td>-47.8</td>
<td>-40.9</td>
<td>17 Congenital anomalies</td>
<td>13.0</td>
<td>7.2</td>
<td>-2.2</td>
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<tr>
<td>18 Interpersonal violence</td>
<td>18 Leukaemia</td>
<td>-1.8</td>
<td>-10.6</td>
<td>-21.1</td>
<td>18 Leukaemia</td>
<td>0.4</td>
<td>-4.7</td>
<td>-13.6</td>
</tr>
<tr>
<td>19 Leukaemia</td>
<td>19 Drug use disorders</td>
<td>158.7</td>
<td>135.5</td>
<td>139.7</td>
<td>19 Drug use disorders</td>
<td>20.8</td>
<td>14.7</td>
<td>18.9</td>
</tr>
<tr>
<td>20 HIV/AIDS</td>
<td>20 Prostate cancer</td>
<td>13.0</td>
<td>2.9</td>
<td>-9.4</td>
<td>20 Prostate cancer</td>
<td>15.5</td>
<td>9.7</td>
<td>-7.6</td>
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<tr>
<td>21 Cardiomyopathy</td>
<td>21 Cirrhosis alcohol</td>
<td>6.7</td>
<td>-2.8</td>
<td>-16.5</td>
<td>21 Cirrhosis alcohol</td>
<td>2.7</td>
<td>-2.5</td>
<td>-9.4</td>
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<td>22 Cardiomyopathy</td>
<td>-9.5</td>
<td>-17.6</td>
<td>-27.4</td>
<td>22 Cardiomyopathy</td>
<td>16.9</td>
<td>10.9</td>
<td>-4.0</td>
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<td>23 Cirrhosis alcohol</td>
<td>23 Falls</td>
<td>3.0</td>
<td>-6.3</td>
<td>-20.7</td>
<td>23 Falls</td>
<td>7.4</td>
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<td>24 Other neoplasms</td>
<td>24 Prostate cancer</td>
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<td>24 Prostate cancer</td>
<td>2.9</td>
<td>-2.3</td>
<td>-11.9</td>
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</tbody>
</table>

Our technology: Ceramil®
**Biomaterials**

**DEFINITION:**
Material used to replace a part of human body in a safe and reliable way

<table>
<thead>
<tr>
<th>Metallic Biomaterial</th>
<th>Ceramic Biomaterial</th>
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<tbody>
<tr>
<td>Pure metal</td>
<td>Inert organic ceramic</td>
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<tr>
<td>Metallic alloys</td>
<td>Active organic ceramic</td>
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</table>

<table>
<thead>
<tr>
<th>Natural Biomaterial</th>
<th>Polymer Biomaterial</th>
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<tbody>
<tr>
<td>Plant origin</td>
<td>Plastics</td>
</tr>
<tr>
<td>Animal origin</td>
<td>Elastomers</td>
</tr>
</tbody>
</table>

Alumina: $\text{Al}_2\text{O}_3$
Unique expertise in Bioceramic
CT-scan of a sternum and a tibial osteotomy wedge after its removal (non ceramic material in pores).

Images from Pr J. Monteil and Dr I. Quelven-Bertin – CHU Limoges
Main characteristics

- Unique capacity of bone integration
- Porosity range from 100 to 900 μm
- Proved biocompatibility
  - > 6,000 implants over a 8-year period
- Inert
- Non resorbable
- Mechanical strength more than 20 MPa
  - 3 times bone strength

THE RANGE OF POROUS CELLULAR ALUMINA BIOCERAMIC

- NO MIGRATION,
- NO COLLAPSE
- FUSION from 3rd month = No osteosynthesis (screw or osteosynthesis plate)

POST SURGERY  3 MONTHS  6 MONTHS  12 MONTHS
Low bacterial adhesion

- **In vitro**
  - Colony forming unit stuck to several materials
  - A: *Staphylococcus aureus*
  - B: *Pseudomonas aeruginosa*
  - Strains forming biofilm

- **In human medicine**
  - No infection due to our material among > 6000 implants

---

Dr T.S Ouk, MCU-Ph - Laboratoire de Chimie des Substances Naturelles, University of Limoges
Great osseointegration

- Bone cells colonize pores and secrete and mineralize bone matrix

MC3T3 cells. Nucleus marked with DAPI.
Our technology: Ceramil®
Antibiotic loading
Antibiotic addition

**Why?**

- To improve implant protection at the time of surgery until wound heals
- Because thanks to Biofilm, bacteria can colonize biomaterial and stay
  - « The race for the surface »*
- To deliver high concentrations at the infected site
  - To avoid bacterial colonization and device infection
  - In the future: to cure hard-to-treat infections

* Gristina AG. Science. 1987;237:1588–95.
Material colonisation

H+2  Adhesion

H+4  Beginning of biofilm formation

H+8  Biofilm over all the surface

H+24 Bacteria release
Biofilm - bacteria

- Self-produced matrix of hydrated extracellular polymeric substances
- Bacteria living together with many interactions
- Decrease of:
  - metabolism
    - and antibiotic incorporation
  - growth
Biofilm - Antibiotics

- Decrease penetration
- Heterogeneous diffusion
- Consequence:
  - Major increase in MIC (Minimal Inhibitory Concentration)
    - X10 – X1000
  - Persistance of bacteria in bone and on prosthetic device
**In vitro release**

Gentamicin release from ceramic sternum

Gentamicin and vancomycin release from ceramic cubes
**In vivo**

- **Gentamicin loaded sternum for patients with deep sternal wound infection (mediastinitis)**

<table>
<thead>
<tr>
<th>Loaded dose</th>
<th>Concentration (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># 1</strong> 225 mg</td>
<td>Blood</td>
</tr>
<tr>
<td></td>
<td>&lt; 0,5</td>
</tr>
<tr>
<td><strong># 2</strong> 356 mg</td>
<td>Blood</td>
</tr>
<tr>
<td></td>
<td>Local</td>
</tr>
</tbody>
</table>

With PK/PD parameter of $C_{max}/CMI > 8$ and an MIC of 1 mg/L

* >175 x required dose  
** >50 x required dose
Nowadays
A long time ago, a supposedly impregnable town fell thanks to a clever trick.
Our clinical experience with Ceramil® technology
Ceramil®

- More than 6000 implants
  - Cervical & lumbar cages (spine)
  - Tibial osteotomy wedges (lower limb)
  - Calcaneal wedges (lower limb)
  - Filling disks for drill bit (skull)
  - ...

- No infection
- No material vigilance
- More than 10 years of use
### « Sternum » follow-up

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Indication</th>
<th>Risk factor</th>
<th>BMI</th>
<th>Town</th>
<th>Type of surgery</th>
<th>ATB loaded</th>
<th>Complications</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>Radio-induced sarcoma</td>
<td>Malignancy</td>
<td>22.5</td>
<td>Limoges</td>
<td>Complete replacement</td>
<td>No</td>
<td>None</td>
<td>31.0</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>Breast cancer metastasis &amp; skin localisation following a biopsy</td>
<td>Malignancy, Diabetes mellitus</td>
<td>24.6</td>
<td>Limoges</td>
<td>Complete replacement</td>
<td>No</td>
<td>Hematoma</td>
<td>24.0</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>Sternal disunion after aortic valve replacement</td>
<td>Diabetes mellitus, active smoker (55PA), COPB, lung cancer with radiotherapy including sternal area (2007)</td>
<td>26.3</td>
<td>Limoges</td>
<td>Complete replacement</td>
<td>No</td>
<td>Wound infection without sternal complication</td>
<td>26.4</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>Manubrial breast cancer metastasis</td>
<td>Malignancy, Tobacco (40PA)</td>
<td>19.3</td>
<td>Limoges</td>
<td>Half-sternum replacement</td>
<td>No</td>
<td>None</td>
<td>19.2</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>Sternal disunion after coronary bypass and deep sternal wound infection</td>
<td>Diabetes mellitus, obesity, COPB</td>
<td>29.8</td>
<td>Limoges</td>
<td>Complete replacement</td>
<td>Yes</td>
<td>None</td>
<td>15.6</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>Sternal disunion after coronary bypass and deep sternal wound infection</td>
<td>Diabetes mellitus, obesity, COPB, HTA, Prostate cancer</td>
<td>32.6</td>
<td>Limoges</td>
<td>Complete replacement</td>
<td>Yes</td>
<td>None</td>
<td>11.6</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>Clavicle and manubirum neoplasia</td>
<td>Malignancy (breast (radio/chimio - hepatectomie partielle 2014))</td>
<td>21.9</td>
<td>Reims</td>
<td>Half-sternum replacement</td>
<td>No</td>
<td>None</td>
<td>10.9</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>Manubrial breast cancer metastasis</td>
<td>Breast cancer surgery, obesity, Tobacco</td>
<td>30.1</td>
<td>Nice</td>
<td>Half-sternum replacement</td>
<td>No</td>
<td>None</td>
<td>8.6</td>
</tr>
<tr>
<td>9</td>
<td>F</td>
<td>Manubrial thyroid cancer metastasis</td>
<td>Thyroid cancer</td>
<td>27.9</td>
<td>Reims</td>
<td>Half-sternum replacement</td>
<td>No</td>
<td>None</td>
<td>5.1</td>
</tr>
<tr>
<td>10</td>
<td>F</td>
<td>Breast cancer metastasis</td>
<td>Breast cancer surgery, obesity, obesity</td>
<td>38.9</td>
<td>Limoges</td>
<td>Complete replacement</td>
<td>No</td>
<td>None</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>58.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15.6</td>
</tr>
</tbody>
</table>
Where do we want to go?
A great ambition:
To become the world leader in alumina bioceramics used in the treatment of bone infections and to propose innovative solutions for bone diseases
3 main axes

Other molecules

New shapes, volumes & structure

Worldwide distribution
Other molecules for local delivery

- **Infection**
  - Antibiotic and antibiotic combination
  - From prophylaxis to treatment (targeting a known bacteria)

- **Cancer (primary & metastases)**
  - Local delivery of high doses & decreased systemic toxicity

- **Accelerate osseointegration**
  - For jawbone to be able to eat again faster

- **Bone-targeting molecules**
Other shapes and volumes

- Current Products
- Development (examples)
Dual structure

- Gradiation of porosity
  - From porous (osseointegration)
  - To smooth surface structure (joint)
Worldwide distribution

- **Partnership**
  - Distribution of our products in different parts of the world
  - Companies with wide distribution network

- **Building new production units**
  - To be close to surgeons and markets
THANK YOU FOR YOUR ATTENTION

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- : I.CERAM
- : https://www.linkedin.com/company/11174472/