• tissue sampling with animal identification
• sample handling, storage and transport
• lab integration

Ear tags for tissue sampling

- transparent projectile with metal blade
- sample container with/without desiccant
- male part
- female part
- desiccant
Types of ear tags

- official identification for cattle and sheep in combination with tissue sampling possible
- button tags for all species
- also available with RFID

RFID and tissue sampling
Tissue sampling

Range of application

- parentage testing
- determination of genetic defects
- proof of origin (e.g., quality meat programs)
- genotyping (e.g., scrapie)
- diagnostics (e.g., BVD antibody test)
Advantages

- **☺** definite allocation of sample and animal
- **☺** effective and time saving through automated data registration (human errors prevented)
- **☺** improvement of processing costs (standardized tissue samples)

Standardized sample size
Instrument for sampling

- Press cut with max. Ø
- Fixing of tissue sample by special geometry of blade
- Possibility to control presence of sample through lenticular membrane with magnifier effect

Control of sampling

- Visual control of presence of tissue sample in locked sample container without technical device
- Lenticular membrane delivers insight into the whole cavity of the sample container
- Presence of sample in the tube can be verified also in the lab
Applicators

one type applicable for all ear tags

with or without tissue sampling

parallel closing mechanism
available adapter for all types of animal identification systems/ tissue sampling

• official ID cattle/ sheep
• button tags
• vet kits
• all other conventional ear tags (visual identification)

Sample identification

unique and guaranteed well-defined

labelling standard:
• DataMatrix-code with unique number
• customized identification
  (line one – up to 12 letters)
• individual sample number
  (2nd and 3rd line – up to 24 numbers)
### Sample registration

- Scanning of bottom printed DataMatrix codes in 96 position rack
- Decoding and linking of individual sample numbers with each position on the rack

### Data transfer to automated analytics

<table>
<thead>
<tr>
<th>rack no.</th>
<th>column</th>
<th>row</th>
<th>sample no.</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>123456</td>
<td>1</td>
<td>A</td>
<td>000040010003487</td>
<td>good read</td>
</tr>
<tr>
<td>123456</td>
<td>2</td>
<td>A</td>
<td>000040010003487</td>
<td>good read</td>
</tr>
<tr>
<td>123456</td>
<td>3</td>
<td>A</td>
<td>000040010003487</td>
<td>good read</td>
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<tr>
<td>123456</td>
<td>4</td>
<td>A</td>
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</tr>
<tr>
<td>123456</td>
<td>6</td>
<td>A</td>
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<tr>
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<td>7</td>
<td>A</td>
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<td>good read</td>
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<td>123456</td>
<td>8</td>
<td>A</td>
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<td>good read</td>
</tr>
<tr>
<td>123456</td>
<td>9</td>
<td>A</td>
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<td>good read</td>
</tr>
<tr>
<td>123456</td>
<td>10</td>
<td>A</td>
<td>000040010003487</td>
<td>manually corrected</td>
</tr>
<tr>
<td>123456</td>
<td>11</td>
<td>A</td>
<td>000040010003487</td>
<td>good read</td>
</tr>
<tr>
<td>123456</td>
<td>12</td>
<td>A</td>
<td>000040010003487</td>
<td>vacant</td>
</tr>
<tr>
<td>123456</td>
<td>1</td>
<td>B</td>
<td>000040010003487</td>
<td>good read</td>
</tr>
<tr>
<td>123456</td>
<td>2</td>
<td>B</td>
<td>000040010003487</td>
<td>good read</td>
</tr>
</tbody>
</table>

- Time stamp
- Code deciphered
- Code not recognized
- Corrected data entry
- Vacant position
Lab integration in 96-well format

analysis in standard 96-well format

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Rack for 96-well format

• 96-position rack for highly efficient analysis
• all required steps performable on the same rack:
  • sample registration
  • opening of samples
  • lysis
  • DNA-purification
  • PCR preparation
  • ...

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Storage / transport

Advantages of data handling

- no manual data registration
- no handwritten transfer of sample data to lab databases or analysis reports

⇒ elimination of human error
Advantages of sample-handling

- efficient storage management
  - documentation of all storage movements
  - documentation of sample throughput
  - increase in performance
  ➔ reduction of costs

Automated opening of samples

- pneumatic press with exchangeable punching tool
  - opening by piercing bottom or punching through membrane from top

- guaranteed contamination free
Sample processing by hand

- lysis and incubation directly in the sample container with established protocols
- liquid handling with conventional lab methods

Automated sample processing

- Buffer dispensing with robot
- transfer of eluate to ELISA or PCR well plates
Automated liquid handling

*e.g. for PCR pooling with Corbett robot*

![Automated liquid handling](image)

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### Capacities / performance

<table>
<thead>
<tr>
<th>process</th>
<th>duration</th>
<th>throughput</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>positioning on 96-rack</td>
<td>+/- 3 min</td>
<td>2000 samples/h</td>
<td>possible identification of damaged sample tubes</td>
</tr>
<tr>
<td>registration with scanner</td>
<td>+/- 3 min</td>
<td>2000 samples/h</td>
<td>possible cleaning of dirty sample tubes</td>
</tr>
<tr>
<td>opening with punching tool</td>
<td>+/- 2 min</td>
<td>3000 samples/h</td>
<td>punching tool needs to be decontaminated on a regular basis</td>
</tr>
</tbody>
</table>

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Thank you very much for your attention!