Androstar®
superior protection
Androstar® Premium and Androstar® Plus extenders for boar semen feature an innovative combination of highly effective membrane protecting agents and specialized antioxidants.

Cell Shield Protection (CSP®) is a proprietary component of Androstar® extenders which provides unparalleled protection for sperm when exposed to temperature fluctuations, physical stress and long-term storage. CSP® actively stabilizes sperm membranes maintaining their functional elements and protects against premature sperm capacitation.

Androstar® extenders reduce adverse effects from unpredictable environmental and handling conditions. Androstar® Premium provides outstanding preservation and protection. High stress resistance of the semen leads to more homogeneous results.

**Robustness T³: Temperature, Transport, Time**

**Powerful temperature buffer**  
External influences on the sensitive sperm cells are effectively buffered over a wide temperature range from +5°C to +25°C

**High physical stress resistance**  
The functionality of the spermatid cell membranes is protected against the influences of suboptimal transport and storage conditions

**Long-term preservation**  
Unique proprietary membrane and viability stabilizing components help sperm to maintain their viability over a longer duration
**Results:** The study reveals that boar spermatozoa stored hypothermically at +5°C and diluted in Androstar® Premium preserve not only the sperm quality but ultimately in vivo fertility as well.

Boar sperm stored in Androstar® Premium and submitted to chilling temperatures - intended or not - maintain high motility, membrane integrity and a low DNA-fragmentation index throughout the whole storage period of 24 to 72 hours and their values do not differ from controls stored at +17°C.

Likewise, the responsiveness to capacitating stimuli and the results of the oviduct binding assay do not differ from controls.

Field fertility study with chilled semen

**Description:** Fertility data obtained from 829 sows inseminated with pooled semen of 23 boars (3 boars per pool). Semen was extended in AndroStar® Premium, split in 2 groups and either stored at 17°C with antibiotics (0.25 g/L gentamicin sulphate) or stored at 5°C antibiotic-free. Data for total and live born piglets are presented as mean and SEM.

<table>
<thead>
<tr>
<th></th>
<th>Storage temperature 17°C</th>
<th>Storage temperature 5°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sows (n)</td>
<td>406</td>
<td>411</td>
</tr>
<tr>
<td>Non-return rate (%)</td>
<td>94.1</td>
<td>94.6</td>
</tr>
<tr>
<td>Farrowing rate (%)</td>
<td>93.1</td>
<td>92.0</td>
</tr>
<tr>
<td>Total piglets born</td>
<td>14.06 ± 0.17</td>
<td>14.51 ± 0.15</td>
</tr>
<tr>
<td>Live piglets born</td>
<td>13.20 ± 0.17</td>
<td>13.70 ± 0.15</td>
</tr>
</tbody>
</table>

**Study of responsiveness to capacitating stimuli**

**Description:** Dilution of seven ejaculates of different boars with BTS and Androstar® Plus. Cooling of samples to 17°C, 10°C or 5°C (cooling rate approx. 0.1°C/min). Evaluation of samples on d0 (room temperature, 22°C) and d1 (17°C, 10°C, 5°C) for motility, membrane integrity and responsiveness to capacitating stimuli. The specific response to capacitating stimuli is a sensitive indicator of chilling injury in hypothermically stored boar sperm—normally it decreases in relation to storage temperature.

**Results:** The study confirms Androstar® Plus' protective effects on sperm function and ability to reduce chilling-induced changes in sperm reactivity. Sperm diluted in Androstar® Plus and stored at 5°C show reactivity to capacitating stimuli almost twice as high as BTS-diluted samples. Androstar® Plus maintains high motility and membrane integrity in boar sperm stored below 15°C. At 5°C storage, the differences/advantages compared to a standard extender are most evident.

Androstar® Plus: optimal insemination results after short and long-term storage

Long-term preservation of boar semen:
With their highly effective membrane protectors and advanced antioxidants, Androstar® extenders maintain optimal storage conditions over a minimum of 7 days after semen production. Their high protection performance makes them the perfect choice for semen that needs to be transported over long distances. Also biosecurity time requirements can be met without problems.

Compensation of detrimental effect of seminal plasma (SP):
The long-term exposure to autologous SP causes a dramatic loss in sperm motility in some boars. Studies prove that even in boars with high sensitivity of sperm to autologous SP, the protective Androstar® extenders counteract this detrimental effect on sperm during long-term storage.


Comprehensive field study in the US

Description: Retrospective field study on the influence of semen age (day 1 = 24 hours age of semen) on fertility with three commercial sow farms in the US using Androstar® Plus on a total of 12,000 sows. 300 sows per age of semen were randomly selected.

<table>
<thead>
<tr>
<th>Mean semen age (d)</th>
<th>Total born piglets (n)</th>
<th>Farrowing rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>14.36</td>
<td>86.7</td>
</tr>
<tr>
<td>2.0</td>
<td>14.11</td>
<td>87.7</td>
</tr>
<tr>
<td>3.0</td>
<td>13.91</td>
<td>89.0</td>
</tr>
<tr>
<td>4.0</td>
<td>14.16</td>
<td>86.0</td>
</tr>
<tr>
<td>5.0</td>
<td>14.8</td>
<td>86.7</td>
</tr>
<tr>
<td>6.0</td>
<td>14.27</td>
<td>90.3</td>
</tr>
</tbody>
</table>

Results: Androstar® Plus supports semen fertility and reproductive performance over a minimum of 6 days from semen production. In these commercial farms excellent reproductive performance of sows is achieved with Androstar® Plus, independent of semen age.

Andy Kamm, Boar Stud Manager,
Wakefield Pork, Minnesota, United States

"Androstar® Premium with its wide temperature protection allows us to confidently ship semen in any weather Minnesota has and not sacrifice any production or semen quality at the sow farm."

Confidential customer data
By switching to Androstar® Plus, we gave our customers the option to inseminate even days after the semen tube delivery. They gratefully accepted the logistic benefits - and at the same time achieved greater fertility in their sow herd!

Josef Limmer, Laboratory Head Eberstation Kammerlehen, Bayern-Genetik GmbH, Germany

Laboratory trial long-term storage

Description: In a test series at the University of Veterinary Medicine Hannover, Foundation (TiHo) semen from 7 boars was diluted and stored with Androstar® Plus (17°), Androstar® Premium (17°) and Androstar® Premium (5°, without antibiotics). This test was conducted during summer months. After 24, 144, 240 and 336 hours, motility and membrane integrity were examined.

Results: Motility and membrane integrity decrease only slightly over the course of storage. This proves that Androstar® extenders protect the functionality of sperm cells very well over a period of up to 14 days and maintain a high level of boar semen quality even after long-term storage.

Consistent quality results even after 14 days storage

University of Veterinary Medicine Hannover, Foundation (TiHo) (2019): Laboratory trial.
Compensate for the negative impact of transport stress:
With their potent buffer system, Androstar® extenders counteract vibration emission-induced injury of long-term stored boar sperm. Extender components are especially selected for their ability to protect the functionality of sperm under conditions of transport.

**Androstar® Premium & Androstar® Plus: protected sperm cells under uncertain transport conditions**

**Quality of sperm subjected to vibration**

**Description:** Semen from a total of 18 ejaculates was isothermically diluted to a volume of 80 ml containing $23.5 \times 10^6$ sperm/ml. Extenders used were BTS, Androstar® Plus and Androstar® Premium (6 boars per experiment). Split samples were filled into 95 ml QuickTip Flexitubes® and exposed to a rotation speed of 150 rpm circular horizontal frequencies with an amplitude of 1 cm for 120 min at 21°C in the dark. Control samples remained unshaken. Semen doses were then stored for 144 h at 17°C.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>BTS diluted samples control w/o air</th>
<th>Androstar® Plus diluted samples control w/o air</th>
<th>Androstar® Premium diluted samples control w/o air</th>
<th>BTS diluted samples shaken with air</th>
<th>Androstar® Plus diluted samples shaken with air</th>
<th>Androstar® Premium diluted samples shaken with air</th>
</tr>
</thead>
<tbody>
<tr>
<td>ph</td>
<td>7.41</td>
<td>&lt;7.10</td>
<td>&lt;7.30</td>
<td>7.50</td>
<td>&lt;7.10</td>
<td>&lt;7.30</td>
</tr>
<tr>
<td>progressive motility</td>
<td>77.3</td>
<td>85.2</td>
<td>94.8</td>
<td>71.3</td>
<td>81.4</td>
<td>93.2</td>
</tr>
<tr>
<td>acrosome integrity</td>
<td>90.2</td>
<td>94.8</td>
<td>93.3</td>
<td>87.1</td>
<td>93.2</td>
<td>91.6</td>
</tr>
</tbody>
</table>

**Results:** Androstar® Plus and Androstar® Premium counteract vibration induced injury in long-term stored boar spermatozoa. The values for both, progressive motility and acrosome integrity, are higher with Androstar® Plus and Androstar® Premium than with a standard extender.


Consistent quality results despite of vibration stress
Why choose Minitube Androstar® extenders?

Performance
Even under temperature, transport and time stress, Androstar® extenders provide unmatched robustness to sperm cells, maintaining high levels of viability and fertility of the semen.

Security
GMP (Good Manufacturing Practice)-certified quality control standards combined with strict quality assurance measures and complete documentation at each stage in production give you sense of security.

Outstanding preservation properties
More ejaculates reach end of storage time with optimal semen quality

Increased sperm viability of the ejaculate
More piglets per boar, greater reproductive efficiency

Safe and reliable products
Production and strict quality control under GMP certified standards