(a) Posterior pituitary and hypothalamus

Paraventricular nucleus
Neurosecretory neurons
Supraoptic nucleus

Pars tuberalis
Pars nervosa (posterior lobe)
Arterial inflow

Pars distalis
Pars intermedia

Venous outflow

(b) Anterior pituitary and hypothalamus

Neurosecretory cells in the hypothalamus secrete neurohormones at the capillaries of the median eminence...

Arterial inflow

Capillaries of median eminence
Hypothalamo-hypophyseal portal vessels

...which travel through the portal vessels to the anterior pituitary...

...and stimulate or inhibit secretions by the anterior pituitary endocrine cells.
Neural stimuli: stress

Neural stimuli: suckling and parturition

Increased plasma osmolarity

Oxytocin

ADH

MAMMARY GLANDS  Milk ejection

KIDNEY  Increased renal tubular resorption of water

UTERUS  Smooth muscle contractions during and after childbirth
TABLE 14.3 Vasopressins and oxytocins found in vertebrate animals

<table>
<thead>
<tr>
<th>Common name</th>
<th>Found in</th>
<th>Amino acid site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arginine vasopressin (AVP)</td>
<td>Most mammals</td>
<td>Cys Tyr Phe Gin Asn Cys Pro Arg Gly(NH₂)</td>
</tr>
<tr>
<td>(Antidiuretic hormone, ADH)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lysine-vasopressin (LVP)</td>
<td>Pig, peccary, hippopotamus</td>
<td>Cys Tyr Phe Gin Asn Cys Pro Lys Gly(NH₂)</td>
</tr>
<tr>
<td>Arginine vasotocin (AVT)</td>
<td>Nonmammalian vertebrates</td>
<td>Cys Tyr Ile Gin Asn Cys Pro Arg Gly(NH₂)</td>
</tr>
</tbody>
</table>

Vasopressins and oxytocins are hormones that play a role in water conservation and the regulation of blood pressure. They are synthesized and stored in neurosecretory centers and released into the bloodstream. The table above lists the amino acid sequences of various vasopressins and oxytocins found in different vertebrate animals.

**Water conservation**
- Arginine vasopressin (AVP) is found in most mammals.
- Lysine-vasopressin (LVP) is found in pig, peccary, and hippopotamus.
- Arginine vasotocin (AVT) is found in nonmammalian vertebrates.

**Vasopressins in Mammals**
- Arginine vasopressin (AVP)
- Lysine-vasopressin (LVP)
- Arginine vasotocin (AVT)

**Vasopressins in Birds**
- Neurtokin (oxytocin in some species)

**Vasopressins in Reptiles**
- Neurtokin (oxytocin in some species)

**Vasopressins in Amphibians**
- Neurtokin (oxytocin in some species)

**Vasopressins in Fishes**
- Neurtokin (oxytocin in some species)
- Glutaminotocin

**Vasopressins in Sharks and Rays**
- Neurtokin (oxytocin in some species)

**Vasopressins in Cyclostomes**
- Neurtokin (oxytocin in some species)
(c) Anterior pituitary hormones

- **TSH**
  - Thyroid gland
  - Thyroid hormones ($T_3$ and $T_4$)
  - Metabolism, growth

- **ACTH**
  - Adrenal cortex
  - Glucocorticoids
  - Stress response; metabolic actions

- **Growth hormone**
  - Liver
  - Insulin-like growth factors
  - Growth of many tissues
  - Many tissues
  - Metabolic actions

- **MSH in some animals**
  - Skin darkening in amphibians, reptiles, and fish

- **Prolactin**
  - Mammary glands of mammals
  - Various vertebrates
    - Growth during pregnancy; milk production
    - Influences many functions, including reproduction, water and ion balance, and caring for young

- **LH**
  - Gonads (ovaries in females, testes in males)
    - Sex hormone production and secretion

- **FSH**
  - Sperm production in males; follicle development in females
SISTEMA NERVIOSO

HIPOTALAMO

HORMONAS HIPOFISOTROPAS

<table>
<thead>
<tr>
<th>Liberadora de ACTH</th>
<th>Liberadora de TSH</th>
<th>Liberadora de LH y FSH</th>
<th>Liberadora de GH</th>
<th>Liberadora de PR</th>
<th>Liberadora de MSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRH</td>
<td>TRH</td>
<td>Gn-RH</td>
<td>GH - RH</td>
<td>PRH</td>
<td>MRH</td>
</tr>
</tbody>
</table>

LORULO ANTERIOR DE HIPOFISIS

<table>
<thead>
<tr>
<th>Síntesis y secreción:</th>
<th>Síntesis y secreción:</th>
<th>Síntesis y secreción:</th>
<th>Síntesis y secreción:</th>
<th>Síntesis y secreción:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTH</td>
<td>TSH</td>
<td>LH</td>
<td>GH</td>
<td>PR</td>
</tr>
</tbody>
</table>

LORULO INTERMEDIO DE HIPOFISIS

<table>
<thead>
<tr>
<th>Síntesis y secreción:</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSH</td>
</tr>
</tbody>
</table>
Evolution of Pinealocytes

- Neurosecretory pinealocyte
- Rudimentary photoreceptor pinealocyte
- Photoreceptor pinealocyte
- Hagfish (none)
- Lamprey
- Elasmobranch
- Teleost fish
- Anuran
- Salamander
- Turtles
- Lizard
- Crocodile (none)
- Bird
- Snake
- Mammal

- Epidermis
- Dermis
- Skull
- Epiphysis (pineal)
- Dorsal sac
- Paraphysis
- Teletost
- Epidermis
- Dermis
- Skull
- Epiphysis
- Pineal organ
- Ventricle
- Dorsal sac
- Paraphysis
- Frog
- Midbrain
- Pineal tract
- Ventricle
- Dorsal sac
- Paraphysis
- Mammal
- Epiphysis (pineal gland)
- Cerebellum
- Midbrain
- Posterior commissure
- Habenula
- Cerebrum
- Mammal
- Accessory parietal organ
- Epidermis
- Dermis
- Skull
- Epiphysis
- Parietal eye
- Parietal nerve