**What are *Leishmania* parasites?**

- Protozoan parasites (proto = first; zoan = animal)
- Small (usually microscopic) single-celled organisms
- Life cycle can be divided into 2 stages depending on the host:
  - Sand fly vector = *Leishmania* promastigotes
  - Human or other vertebrate = *Leishmania* amastigotes

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**Life cycle of *Leishmania* parasites**

1. **Inoculation** (by sand fly bite)
2. **Attachment and phagocytosis** by macrophages
3. **Release from macrophages**
4. **Transformation** to promastigotes
5. **Multiplication**
6. **Transformation** to amastigotes
7. **Ingestion** by vertebrate host
8. **Multiplication** and reinfection
9. **Transformation** to promastigotes
10. **Attachment and phagocytosis** by macrophages

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**Leishmania amastigotes**
- Form of *Leishmania* within human or other vertebrate host’s cells (have resorbed their flagellum)
  - Size: 2-6 mm
  - Shape: ovoid
  - Characteristics: central nucleus

**Leishmania promastigotes**
- Form of *Leishmania* within sand fly vector:
  - Can move in the direction of their flagellum
  - Can be cultured

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**Different parasites cause different forms of the disease**

<table>
<thead>
<tr>
<th>Type</th>
<th>Pathogen</th>
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<tbody>
<tr>
<td>Cutaneous leishmaniasis</td>
<td></td>
</tr>
<tr>
<td>Visceral leishmaniasis</td>
<td>L. donovani</td>
</tr>
</tbody>
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*Leishmania* fact sheet