The caecal ligation and puncture (CLP) animal model for polymicrobial septic peritonitis

Systemic inflammation or sepsis is a reaction of the immune system in response to intensive and massive infections. To study the pathophysiology of human sepsis, cecal ligation and puncture (CLP), an animal model of polymicrobial septic peritonitis, was developed and described in 1980 by Wichtermann *et al*. Today, CLP is one the most widely used animal models of the systemic inflammatory response syndrome (SIRS), sepsis and septic shock because it closely mimics the progression and characteristics of human sepsis. Sepsis is induced by the perforation of the caecum leading to the release of faecal material into the peritoneal cavity to generate an exacerbated immune response induced by polymicrobial infection.

Species:
Rodents (mouse; rat)

Fields of application:
- Basic sepsis research
- Modelling of pathophysiological processes within the human immune system during SIRS, sepsis and septic shock
- Testing novel therapeutic agents
- Drug testing

Endpoints/Outcome parameter:
- Organ damage
- Defined time
- Survival

Readout parameter
Post mortem blood and organs are recovered for further analysis by various methods such as flow cytometry, cell sorting, western blot, immunohistochemistry, quantitative real-time polymerase chain reaction (qPCR), cytometric bead array (CBA) or enzyme-linked immunosorbent assay (ELISA) and high-performance liquid chromatography (HPLC).

Quality management and validation:
Thiazolidinediones (TZDs) like ciglitazone, pioglitazone and rosiglitazone are effective in reducing inflammation when administered in the hyperinflammatory phase of sepsis. In contrast, selective peroxisome proliferator-activated receptor gamma modulators (SPPARγMs) and/or PPARγ antagonists, for example, 2-chloro-5-nitrobenzanilide (GW9662), are effective in reducing T cell apoptosis when administered in the hypoinflammatory phase of sepsis. Such compounds can be used as reference compounds for the development of new compounds for the treatment of sepsis.

References:

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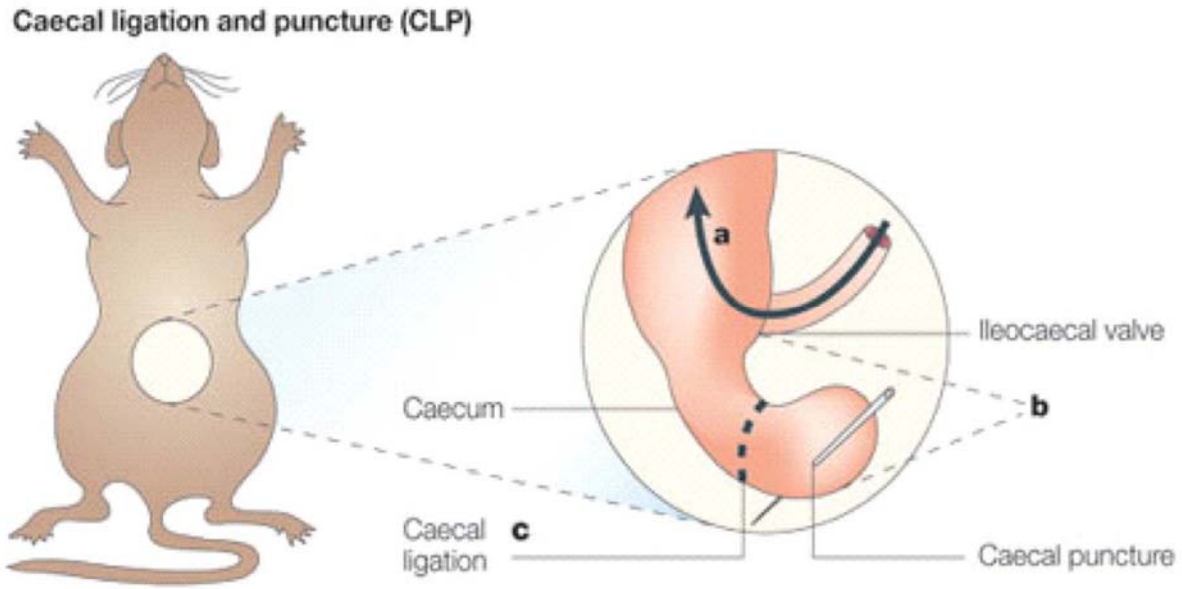

Figure: The caecal ligation and puncture (CLP) model of sepsis at Fraunhofer-TMP, induced by laparotomy and exposure of the junction between the large and small intestines. Source: Buras JA, Holzmann B, Sitkovsky M. Animal Models of sepsis: setting the stage. Nature Reviews Drug Discovery 4, 854-865 (October 2005). doi:10.1038/nrd1854

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