Diagnostic Exercise

From The Davis-Thompson Foundation*

Answer Sheet

Case: **192**; Month: J**uly**; Year: **2022**

Title: Necrotizing placentitis by *Coxiella burnetti* in a cow

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Clinical History: A three-month gestation bovine fetus and the placenta from a Holstein aborted cow were submitted to determine the cause of the abortion.

Necrospy findings: No significant gross abnormalities were observed in the fetus or placenta.

Microscopic Images:

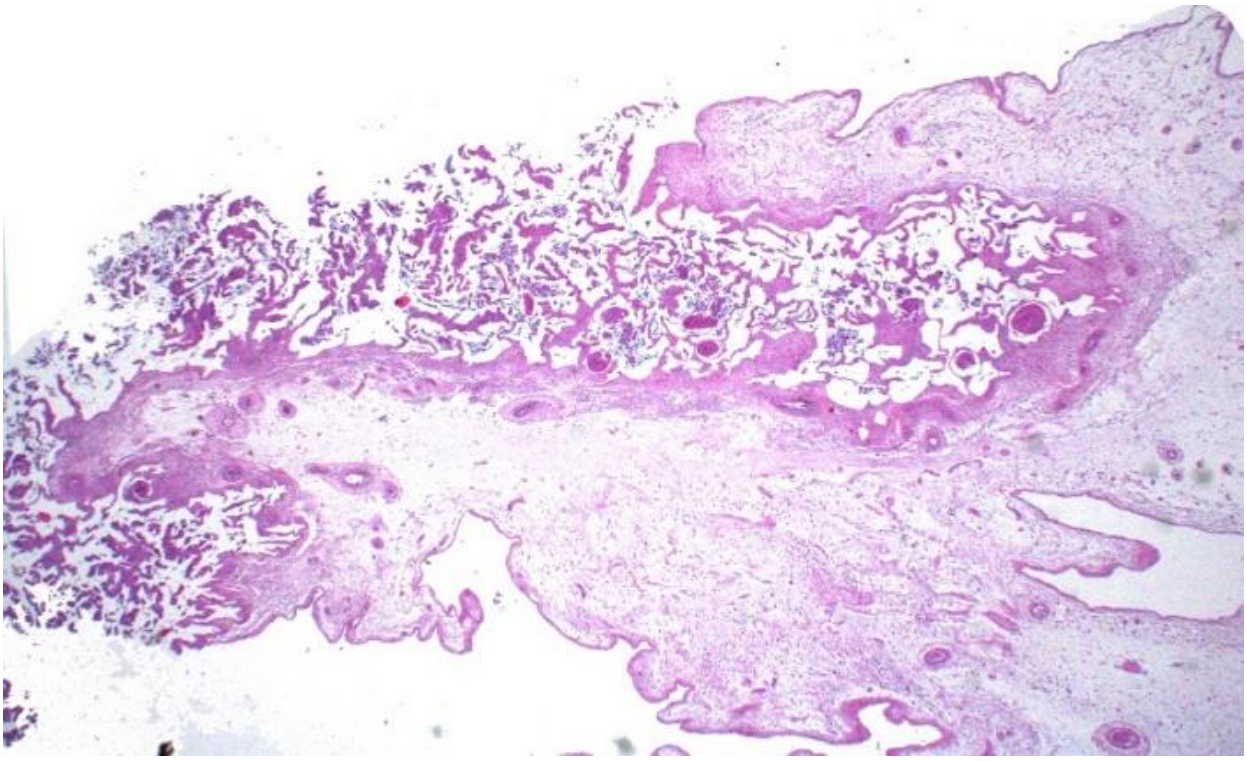

Fig. 1. Placenta. HE. Photo courtesy of F. Uzal.

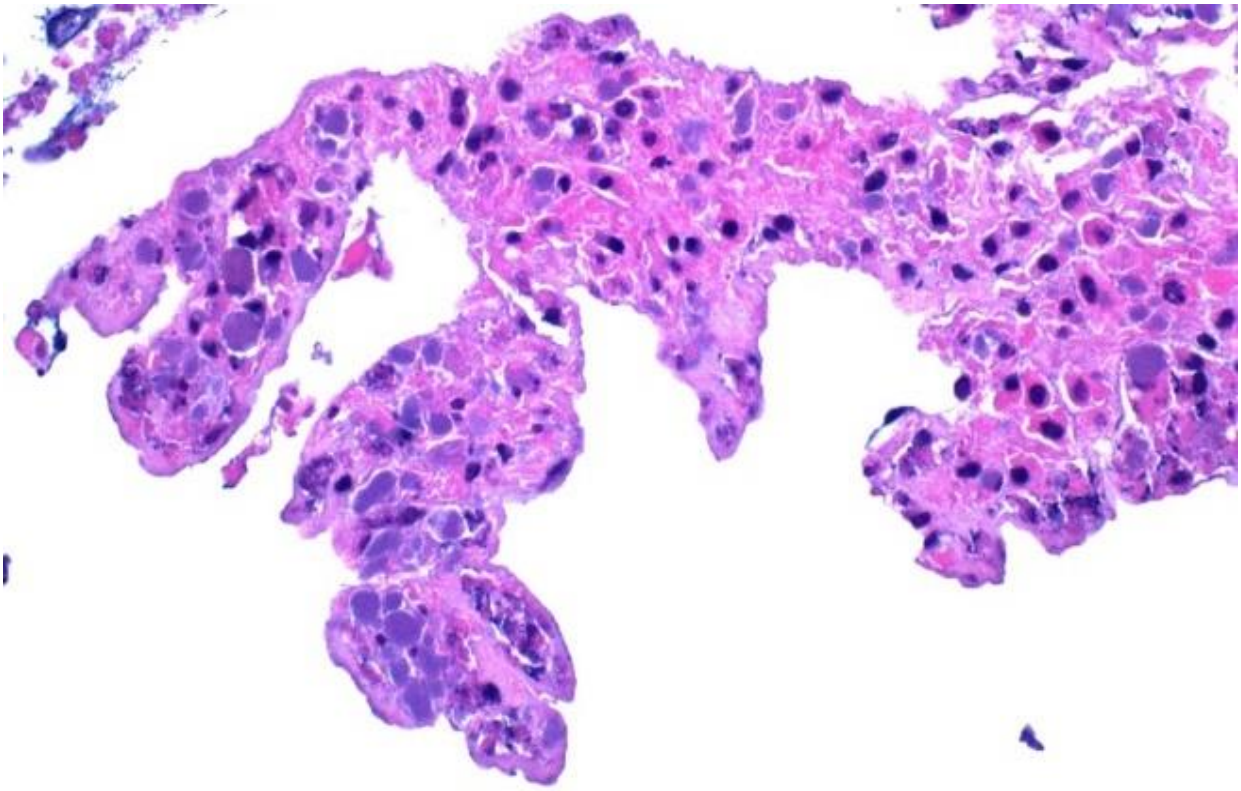

Fig. 2. Placenta. HE. Photo courtesy of F. Uzal.

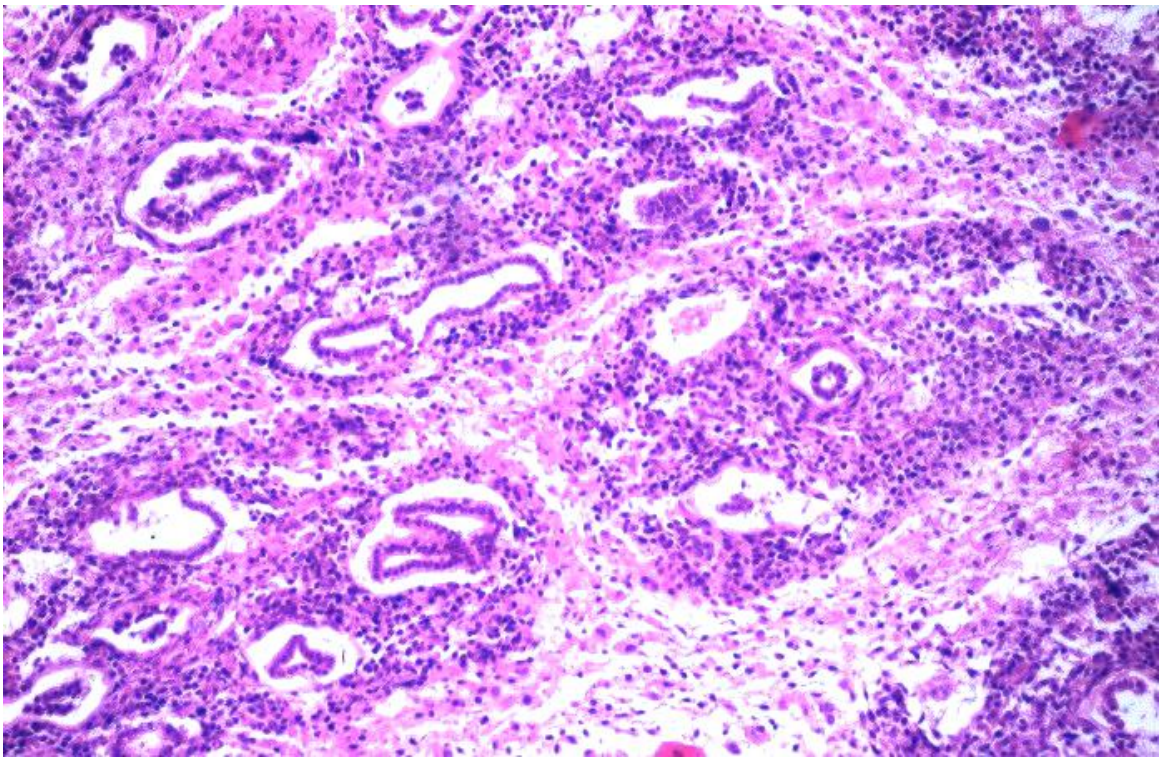

Fig.3. Fetal lung. HE.

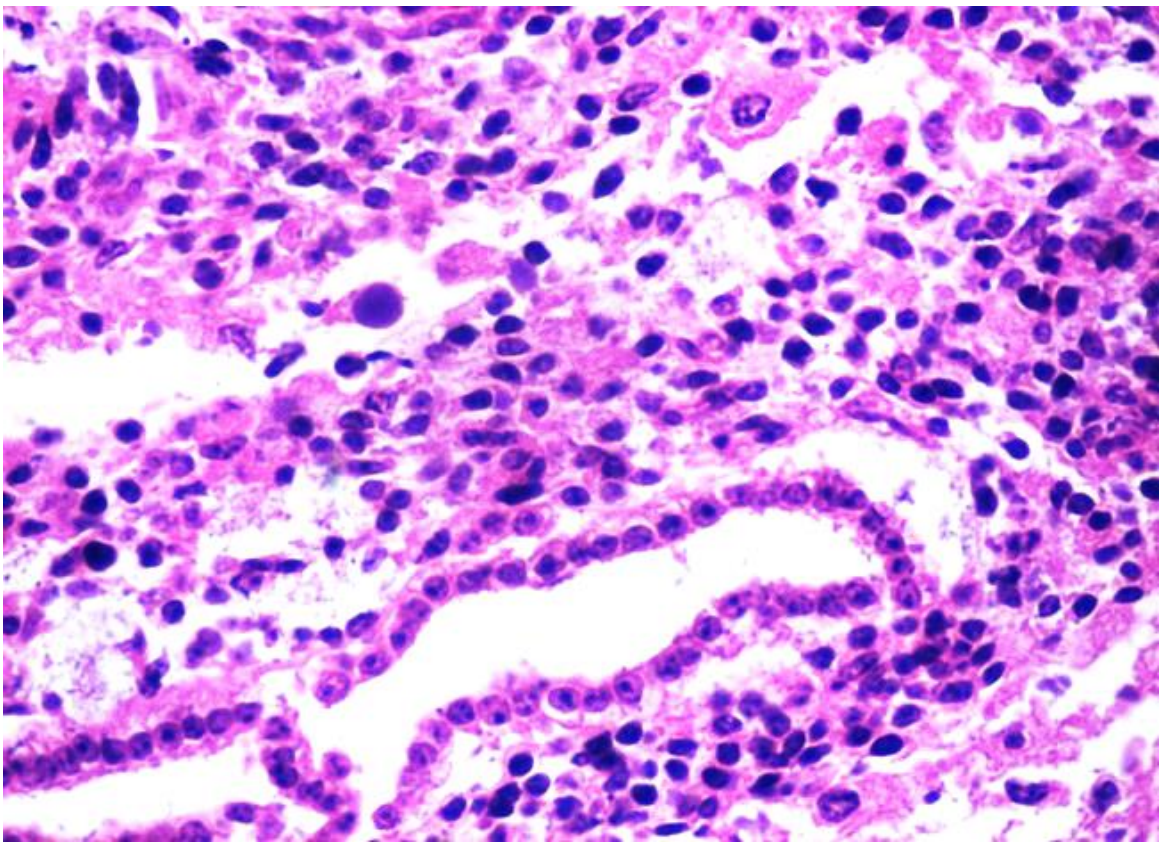

Fig. 4. Fetal lung. HE.

Morphologic diagnosis 1: Placentitis, necrotizing, multifocal, severe with intracellular bacteria (Figs 1, 2).

Morphologic diagnosis 2: Pneumonia, lymphohistiocytic, diffuse, severe with intracellular bacteria (Figs 3, 4).

Etiology: *Coxiella burnetti*

Special stains frequently employed for the identification of the organisms. Gimenez (Fig. 5) and Steiner (Fig. 6)

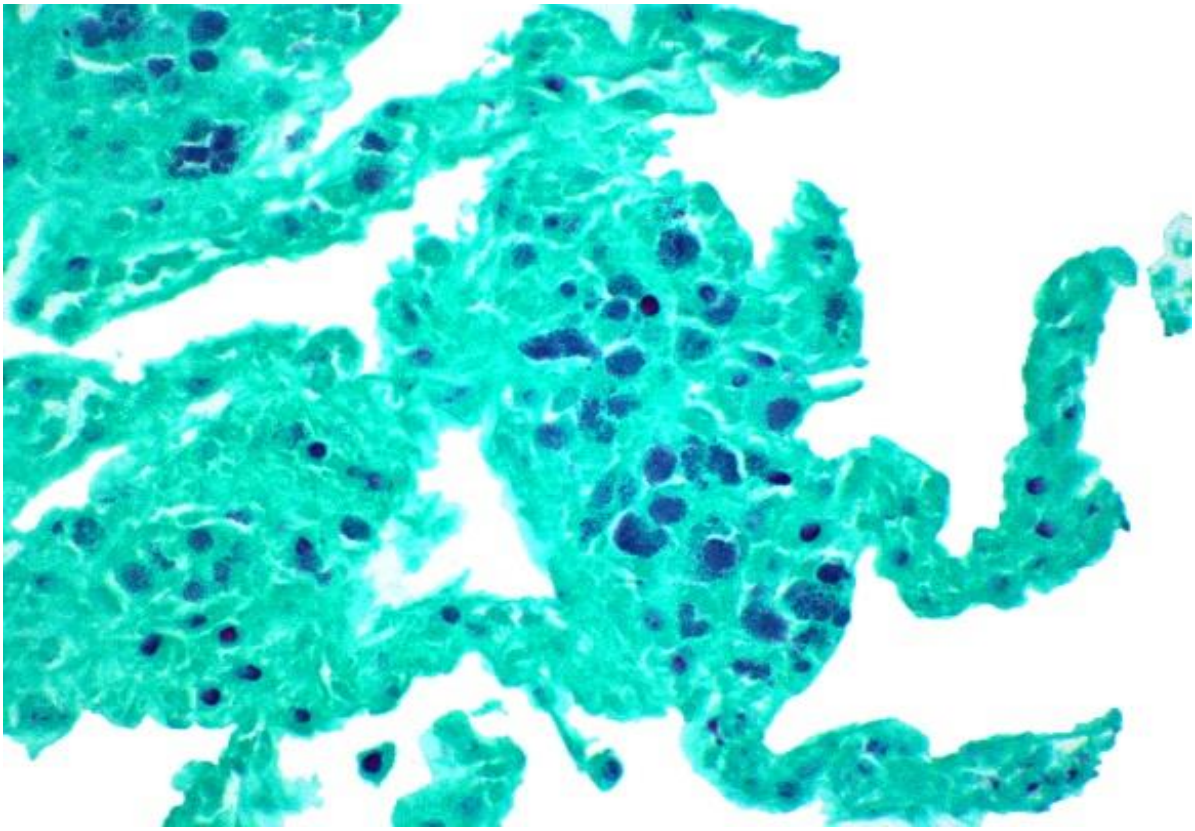

Fig. 5. Placenta. Gimenez. Photo courtesy of F. Uzal.

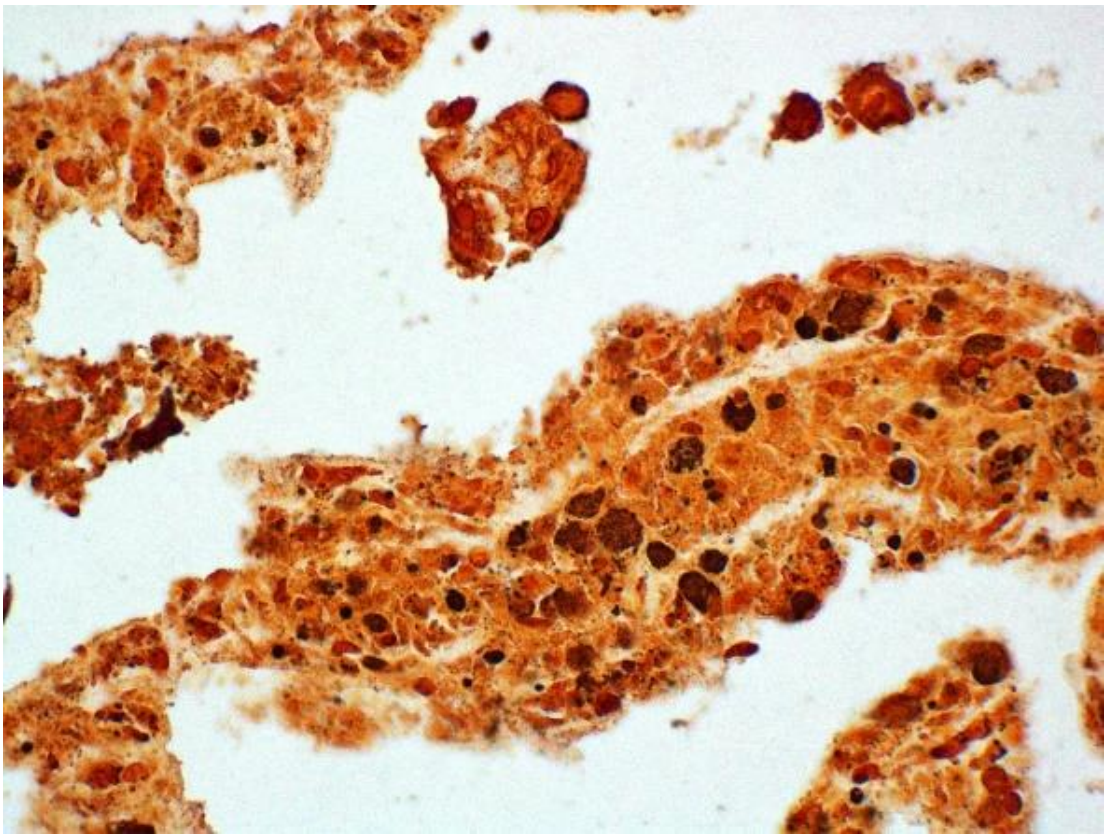

Fig. 6. Placenta. Steiner. Photo courtesy of F. Uzal.

Confirmatory diagnostic technique

Immunohistochemistry (Fig. 7)

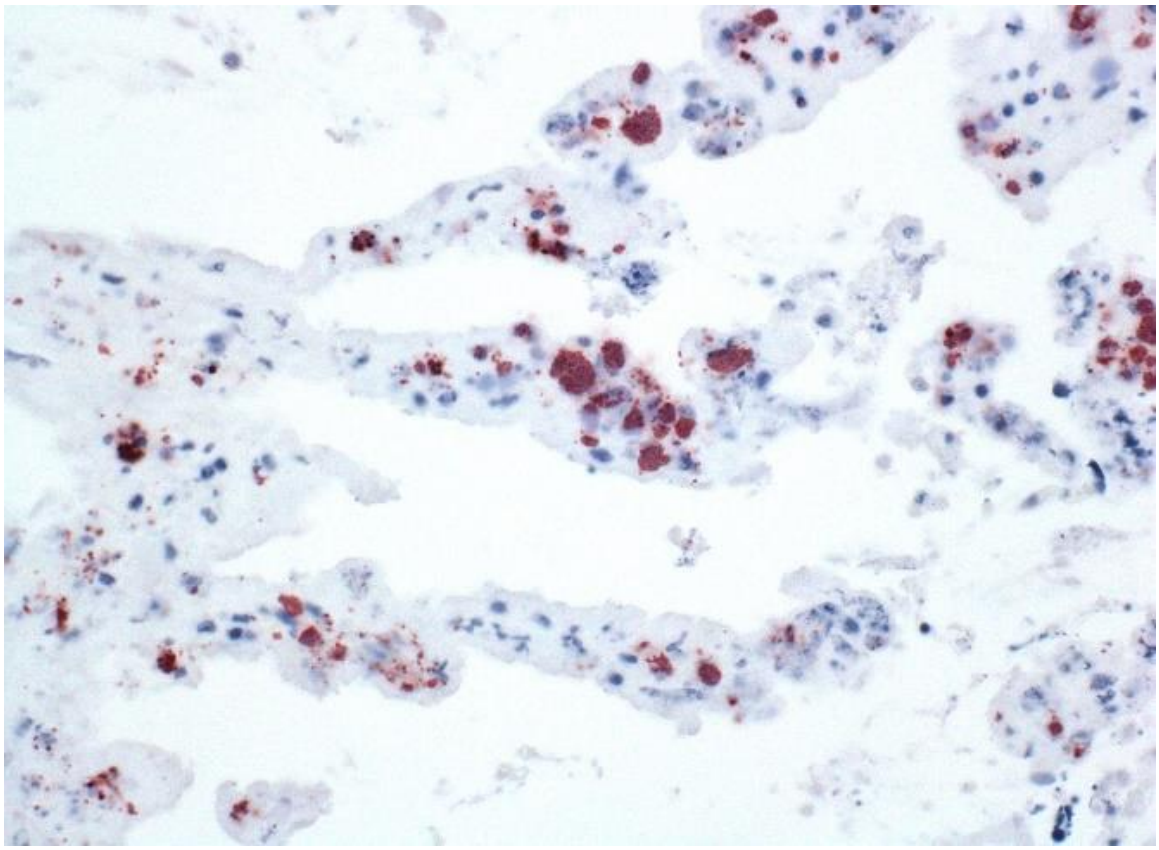

Fig. 7. Placenta. Multifocal intralesional immunoreactivity for *C. burnetii* in the chorionic villi. IHC. **Photo courtesy of F. Uzal.**

Comments:

Coxiella burnetti is a gram-negative, intracellular proteobacterium of worldwide distribution that causes query (Q) fever in humans and coxiellosis in animals (1). The bacterium is able to survive in a spore like status for a long time. Goats, sheep and cattle are considered as the primary reservoirs of *C. burnetii* and the main sources for human infection. Infection has also been noted in several other hosts including birds, ticks and companion animals such as cats and dogs (1). High concentrations of the bacterium can be found in placenta and fetal fluids of infected animals, but shedding also occurs through milk, feces and vaginal mucus (2). Acute infection in domestic small ruminants may manifest itself as late third trimester abortions, stillbirths, delivery of weak neonates, retained placentas, endometritis and infertility. (3). In cattle, coxiellosis is mainly subclinical, but anorexia, stillbirth, and late-term sporadic abortion have been

described, albeit infrequently (4). When the placenta is infected, the obligate intracellular bacteria are encountered within the cytoplasm of trophoblasts. Gross lesions in the placenta (not noted in this case) include thickened and leathery appearance, and off-white exudates which are most prominent in the intercotyledonary regions of the chorioallantois. However, microscopically, the predominantly necrotizing and suppurative placentitis frequently extends into cotyledonary regions as well (5). Gross examination of the placenta of aborted cattle coupled with histopathology and IHC are key for the diagnosis, given that placentitis is the primary lesion caused by *C. burnetii*, with a strong statistical association between intralesional detection of the agent by IHC and placentitis (4). Other differential causes for necrotizing placentitis are *Chlamydia abortus* and *Brucella abortus*, which commonly also causes vasculitis, *Campylobacter fetus*, characterized by accumulation of bacteria in placental blood vessels, and *Toxoplasma gondii*, which primarily affects the cotyledons and spares the intercotyledonary areas.

References:

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*The Diagnostic Exercises are an initiative of the Latin Comparative Pathology Group (LCPG), the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. - Consider submitting an exercise! - A final document containing this material with answers and a brief discussion will be posted on the CL Davis website (http://www.cldavis.org/diagnostic_exercises.html).

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