

## Peripheral Neuropathy and Light—Preliminary Report Indicating Prevalence of Nanobacteria in HIV

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Peripheral neuropathy is a common condition in HIV-positive patients and is often experienced in diabetes mellitus. The primary mechanism of the disease, which can considerably aggravate the patient's state, is unknown. The perineurium of patients with peripheral neuropathy is frequently enveloped by apatite. Nanobacteria (NB) are protected by a mineral shell consisting of apatite. Light has been shown to elevate the vitality level of cells, and was predicted to inhibit deposition of stressed NB in the cardiovascular system. Results indicate that light can durably restore the condition of patients with severe peripheral neuropathy.

**Keywords:** peripheral neuropathy • nanobacteria • diabetes mellitus • HIV • AIDS

Depositions of nanoscopic apatite vesicles (NB) have been identified in atherosclerotic plaques and different human tissues.<sup>1</sup> Studies carried out in diabetic patients with peripheral neuropathy regularly showed the presence of calcium phosphate (apatite) coating the perineurium.<sup>2,3</sup> The basic factors predisposing perineural calcification are unknown. Presumably, the apatite layer encapsulating the nerve fibers was a dense network of stressed NB. This hypothesis receives support from the therapeutic success achieved in the treatment of peripheral neuropathy with low level laser light.<sup>4</sup> Laboratory experiments revealed that NB responded to stimulation with low level light virtually similar to the majority of living cells—they replicated.<sup>5</sup> In addition, it has been reported that they secreted less slime.<sup>6</sup> Slime seems to be essential for the formation of atherosclerotic plaque nucleated by stressed NB: it is the bond interconnecting NB.<sup>7</sup> If indeed, the apatite layer deposited on the perineurium of patients with peripheral neuropathy is formed by NB, then it is reasonable to expect that, by preventing slime production, repetitively applied light therapy will help in improving the condition of such patients. The principal symptoms linked to peripheral neuropathy are similar in both manifestations of the disease diabetes mellitus and HIV/AIDS. It is thus plausible that calcification of the perineurium is a common factor in both diabetes and HIV, when accompanied by peripheral neuropathy. Most importantly in this context, HIV-infected patients are reported to exhibit a clear tendency for cardiovascular calcification.<sup>8,9</sup> There exists at present no explanation for the elevated mineral levels in HIV-infected patients. Remarkably, locally administered low level laser irradiation has been reported to have beneficial effects on the development of mouth ulcers in HIV-infected patients.<sup>10</sup>

Peripheral neuropathy is characterized by a sensation of burning associated with numbness in the feet and toes. Severe peripheral neuropathy is usually accompanied by symptoms

such as extreme fatigue, physical weakness, loss of equilibrium, edema, and progressive muscle degeneration. The inner cause of the disease remains unclear. The patient I have treated for peripheral neuropathy, a 77 year-old woman, had the severest form of the disease, but had neither diabetes nor HIV. She stopped working at the age of 76, and was totally healthy until the outbreak of the disease in March 2000. The disease started suddenly with an unspecific numbness, first in the feet then in the hands. The numbness changed soon to hypersensitivity and extremely painful burning of the extremities. Peripheral neuropathy was first diagnosed in May 2000. Initial therapy consisted of a substitution of vitamin B12 over a period of six consecutive months. She stopped with the vitamin because the B12 level normalized and because it did not help. Acupuncture was then applied for one month, however, without any visible improvement. In June 2000, the patient had a typical “duck walk”, could not mount stairs, and presented a constant extreme tiredness. In November 2000, the patient could only walk with help of a pram, or support by a second person. The disease had persisted for more than one year and worsened. By June 2001, the patient could not stand straight on her feet (falling backward was a permanent serious risk), the legs were strongly inflamed, and the muscles started to degenerate. In particular, the feet were burning so much, that sleep during the night was impossible. Laser therapy began in June 2001. In the beginning, only the feet were irradiated, three times per week—a repetition rate found to be an optimum in various tissues,<sup>11</sup> with a device consisting of four 660 nm laser modules with a power of 35 mW each. Four spots could be irradiated simultaneously with a local intensity of about 2000 Wm<sup>-2</sup> per spot. Four areas on each foot were treated in this way, for two minutes per position. This resulted in a surface dose of about 24 × 10<sup>4</sup> Jm<sup>-2</sup> per irradiated spot. After treatment for three consecutive months, first improvements started to become clearly manifest: less burning, less tiredness, and improvement in balance. After the third month, the treatment was reduced

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to only two exposure-sessions per week. Improvement continued with ongoing therapy until practically all of the symptoms of the disease disappeared. Interestingly, the response of the body to locally applied laser light was neither gradually progressive nor spatially restricted, but sudden and systemic, with a dramatic improvement of all the symptoms that could be connected to peripheral neuropathy: pain, weakness, balance, edema, muscles, and mood. The pronounced systemic character of the response indicated that the light employed for irradiation could have targeted one specific system, which appears to be causal for the complete spectrum of the symptoms.

A 38% annual progression in coronary artery calcification has been estimated from a test group.<sup>14</sup> The increase in calcification may possibly be attributed to NB.<sup>1</sup> Due to continuously rising HIV-infections, in particular in the southern parts of Africa, proportionality between the observed HIV-related calcifications,<sup>8,9</sup> and HIV-infections, seems probable. Anticipating such a correlation, confirmation of the proposed model relating biomineralization processes in HIV primarily to deposition of NB, may encourage further exploration, including of possible NB-sources and contamination routes. Animal experiments indicated that the main route for elimination of NB from the body is via the urine. NB have been characterized as biosystems with unique survival capabilities in a primordial soup,<sup>12</sup> and in the atmosphere.<sup>13</sup> This may promote a quantitative analysis of the presence of NB in human and animal excreta, evaluation of modalities by which NB could

access the atmosphere as aerosols, and examination of their survivability in these milieus.

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