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Need for external replication trials in homeopathic basic research: presenting research on three duckweed test systems as an example

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Abstract
One of the main aims in homeopathic basic research is to find reliable test systems that are externally replicable. In face of the replication crisis in research in general and the specificities that are necessary to include in homeopathic basic research, it is of great importance to encourage highquality replication trials. One way to achieve that is to build up a register or a data base for test systems in homeopathic basic research that are already developed to the point that external replication trials are possible. Such a register offers the opportunity to include not just the published information but also helpful insight such as material lists and time frames for easier planning and conduction of replication trials. Additionally, further information on critical environmental parameter, unpublished negative results, etc. could be included. The general frame work of such a register/ data base is demonstrated with the example of three different duckweed test systems developed in our working group since 2001. The growth rate of duckweed (Lemna gibba L., clone number 9352) was investigated in randomised and blinded settings, using either untreated plants or plants pre-treated with a stressor (arsenic solution or calcium deficiency in the growth medium). Within the original trials, potentised substances in the range of 14x-33x were compared to water control groups (succussed and unsuccussed water). The stability of the test systems was investigated in parallel systematic negative control (SNC) experiments. All original trials revealed a significant influence of some potencies on the growth rate of duckweed and stable test systems as shown with SNC experiments. Four internal replication trials for two of the three test systems were conducted. The replication trials showed effects of homeopathic preparations with some differences in effect size and effect direction compared to original studies.

Keywords: homeopathy; basic research; replication; Lemna gibba L.