



Information for employees and students working at the Faculty of Science (W&N)

This AMD information sheet provides information on the causes of CANS / RSI when working in the lab, and what you may do to prevent complaints.

1 What may cause RSI or CANS in the lab?

CANS, formerly better known as RSI (Repetitive Strain Injury), stands for "Complaints of Arm, Neck, and Shoulder", and the causes are not limited to computer work. See [AMD information sheet A021 about preventing CANS/RSI when working with computers](#). The complaints may, among other things, be caused by overtaxing muscle groups, but also by a static posture with a high muscle tone and little movement due to precision work. In regard to overtaxing you have to think of, for example, frequent pipetting or a static posture in microscopy work.

2 Risks and tips when working with pipettes or a microscope

The risk of getting CANS in the lab occurs, among other things, when frequently pipetting large assays, frequent off-pipetting of phase separations, and long periods of microscopy work. During pipetting, as well as microscopy work, you are seated in an unnatural or static posture.

2.1 Pipetting

An example of frequent pipetting is the Radio Immuno Assay (RIA). In the course of performing RIA, small amounts of liquid are pipetted many times into large numbers (sometimes hundreds) of tubes. Especially the tip release of the pipette may require force, and may, due to the large number of actions, cause overtaxing of the thumb muscle. The thumb muscle is located in the lower arm, where overtaxing of the muscle or irritation of the attachment of the muscle to the bone may occur. The use of a suitable pipette (electrical, multi-pipette, etc.) and proper ergonomics may lower the risk. When frequent performance of a RIA is required, (partial) automation with a pipetting robot may be a solution.

The off-pipetting of phase separations (with Pasteur pipettes with pipette fillers) is precision work requiring high concentration. In the course of off-pipetting, the arms and pipette are usually held higher in comparison to normal conditions to properly see the phase separation, which leads to an unnatural posture. All this muscle tension in unnatural postures is a severe strain that increases the risk of CANS. Please check out the trade fairs to see if you may find smart solutions that may prevent this.

The organization of your work and the setup of your workplace are important in preventing CANS too (See Chapter 3).

2.2 Microscopy work

The microscopy work may be divided into two subclasses, which are: the actual studying of preparations through a binocular and image analysis using a pc.

Binocular

In studying a preparation through a microscope you often are seated in a static, straight posture for long periods of time. The actions that are performed during those periods, such as focussing or manoeuvring the preparation, require precision with little movement. The setup and settings of the furniture are important matters under these circumstances (See Chapter 3.1).

Proper design of the microscope may contribute to lowering the risk too. In older microscopes the viewing angle is often higher than 30 degrees, which may cause neck complaints. A modern microscope may be a solution (See box). Do not merely consider economics in purchasing new equipment, but also proper design and convenience of use. Penny-wise may be pound-foolish.

A proper microscope has:

- a low mounting table for easy preparation mounting and removal
 - a telescopic tubus with which the microscope is adjustable to arm length
 - the mounting table control and focus virtually side by side so one may work with both hands in a straight posture
 - a height adjustable tubus
- Source: Arbo-catalogue "Tuinzaadbedrijven" (in Dutch).

Image analysis using a pc

Microscopy work combined with image analysis may lead to the same problems as in [normal computer work](#). Usually, many preparations are studied, performing the same actions, for example, circling or clicking on areas. A proper workplace setting of monitor and chair is essential.

Continuously holding a computer mouse or joystick leads to a constant muscle strain, while this is not always necessary. Holding your hand on the mouse in comparison to placing the hand next to the mouse often makes a factor 4 difference in muscle strain. In addition, there is ergonomic software available on the market, that ensures you will relax your muscles between computer work by performing other actions. Information about this may be found on [this Leiden University website](#). By installing this software on your pc, the risk on CANS may be reduced.

3 Setting up the lab workplace and work organization

Properly setting up the workplace, as well as the organization of work, often do not receive the attention they deserve.

3.1 Setting up the lab workplace

Set your workplace up in such a manner that the required equipment is in a logical position and far reaching is avoided. This way you lower the chance of frequent overstretching of tendons or muscle groups, as well as the risk of accidentally bumping into or contaminating material.

Make sure you are seated in a natural manner and that the furniture is properly adjusted. A properly adjustable and hygienically cleanable chair with feet support is recommended. The gas spring for height adjustment should have sufficient reach for the required heights, the seating and back support should be sufficiently adjustable, and the seating and back should not be cloth, but polyurethane or lacquered wood instead. Polyurethane provides more comfort.

When seated at a worktop there should be enough legroom. The worktop should not be too thick due to the drawers mounted underneath (old furniture). The legs should not be blocked by bottom cupboards or stuff under the worktop. Make sure you are sitting straight and not turned (in a twisted posture) to avoid complaints.

The work environment should be free of drafts or other disturbances that may distract you from your work. Therefore, it is preferred not to choose a workplace in an aisle or gangway. Mark the locations of air inlets to avoid drafts. Make sure there is enough light on your worktop.

In regard to microscopes the height of the table in combination with the type of microscope is important. When it comes to posture, the furniture should be adjustable to avoid an unnatural posture.

3.2 Work organization

From a work organization point of view you could lower the risk of CANS by using alternating tasks, which will help spread the load. Another important aspect is planning. Do not wait until there are large numbers of samples. Frequently measuring a smaller assay leads to fewer repeated actions and unnatural postures, and, therefore, to a lower physical strain per session. This way, there will be time for recovery.

Please also consider adaptations in work organization, such as:

- *a proper planning of your work*
- *a balanced distribution of the work load over multiple employees*
- *sufficient movement by alternating work tasks*
- *sufficient short breaks to avoid damage to tissues*

To avoid CANS, sufficient variety in your work during the day or the week is a requirement. Make sure you move enough and take microbreaks at suitable intervals (put the pipette away for a moment, move your hand away from the mouse for a moment). Microbreaks are important to avoid damage. In addition you need to take a 15 minute break every 2 hours. This applies to pipetting and microscopy work, but also to computer work.

More information about avoiding complaints in pipetting and microscopy work may be found in the "[Arbocatalogus Tuinzaadbedrijven](#)" ([Dutch link](#)).